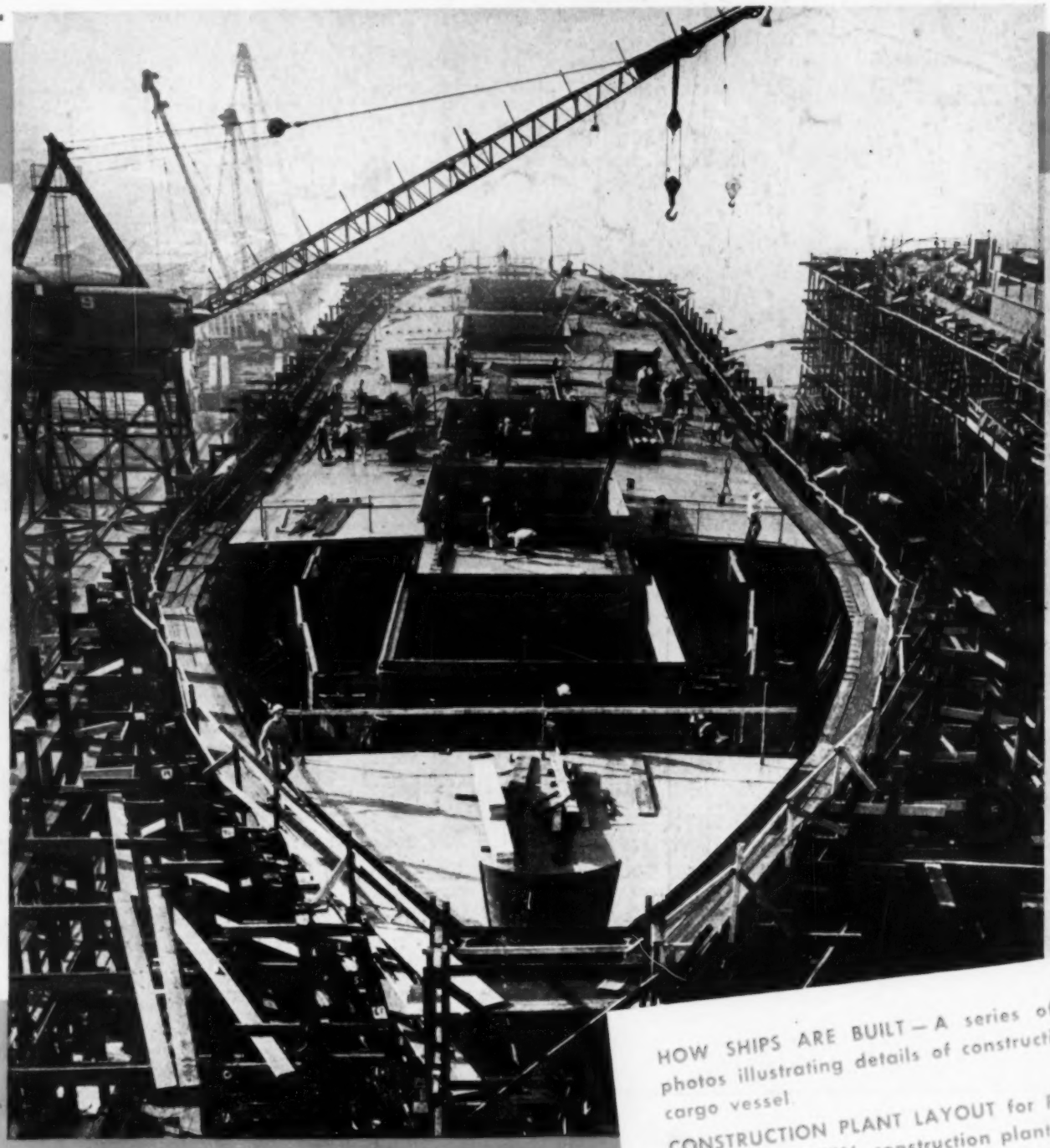
A PICTORIAL SURVEY OF CURRENT PRACTICE, EQUIPMENT AND MATERIALS

TECHNOLOGY DEPT.

Construction Methods

McGRAW-HILL PUBLISHING COMPANY, INC • PRICE 20 CENTS

NOVEMBER
1944



CONSTRUCTION ABOVE DECK nears completion on steel hull for C-1 cargo vessel at shipyard in California.

HOW SHIPS ARE BUILT — A series of step-by-step photos illustrating details of constructing a C-1 steel cargo vessel.

CONSTRUCTION PLANT LAYOUT for Fontana Dam — By R. T. COLBURN, construction plant engineer, TVA.

FULL DEPTH INTERNAL VIBRATION of 12-in.-thick concrete slabs for airfield runway paving

INLAND PILING

Inland service includes furnishing highest quality steel sheet piling, and engineering cooperation in design, fabrication, and field erection.

Bars • Floor Plate • Piling • Plates • Rail • Reinforcing Bars
Sheets • Strip • Structurals • Tin Plate • Track Accessories

INLAND STEEL CO.

38 S. Dearborn Street
Chicago 3, Ill.

Sales Offices: Cincinnati • Detroit • Kansas City • Milwaukee
New York • St. Louis • St. Paul

CURRENT JOBS

. . . and Who's Doing Them

BUILDINGS

Public—Tire plant at Topeka, Kan., will be built by **J. A. Johnson Construction Co.**, of Brooklyn, N. Y., for $4,500,000. **Ford J. Twaits Co.** and **Morrison-Knudsen Co.**, San Francisco, Calif., have $3,987,200 Navy contract for barracks at San Bruno. Contract for $2,887,000 military hospital in Ontario was awarded to **Redfern Construction Co., Ltd.**, of Toronto. Navy contract for buildings at Bangor, Wash., went to **Lease & Leigland and Kuney Johnson Co.**, of **Seattle, for $2,681,122. Virginia Engineering Co., Inc.**, of Newport News, Va., has $2,470,000 Navy contract for storehouse at Williamsburg. Contract for buildings at North Little Rock, Ark., was awarded to **William R. Goss Construction Co.**, of Chicago, Ill., for $1,695,000. Navy contract for mine depot at Yorktown, Va., went to **Doyle & Russell**, of Richmond, for $1,673,320. British Columbia Bridge & Dredging Co., of Vancouver, will build naval depot for $1,400,000. Navy contract for huts and paving at Camp Joseph H. Pendleton, Calif., went to **Haddock Engineers, Ltd.**, of Los Angeles, for $1,200,000. Alcohol plant at Springfield, Ore., will be built by **Ford J. Twaits Co.**, of Seattle, Wash., for $1,185,000. Navy storehouses at Crane, Ind., will be built by **Maxon Construction Co.**, of Dayton, Ohio, for $1,014,000. **National Concrete Fireproofing Co.**, of Cleveland, Ohio, has $1,000,000 contract for test cells at Indianapolis, Ind.

Industrial—Plant extension at Hamilton, Ont., will be built by **Frid Construction Co., Ltd.**, of Hamilton, for $8,000,000. **Ebasco Services, Inc.**, of New York, N. Y., will build steam electric station unit at Dallas, Tex., for $2,500,000. Chemical plant in Pennsylvania will be built by **Koppers Co.**, of Pittsburgh, for $1,000,000.

Commercial—Contract for dwellings at West Los Angeles, Calif., was awarded to **P. W. Truesdale**, of Lakewood Village, for $3,500,000. **Patti-MacDonald Construction Co.**, of Kansas City, Mo., has $2,500,000 contract for apartment buildings in Kansas City.

HEAVY CONSTRUCTION

Air station improvements at San Diego, Calif., will be built for Navy by **Macco Construction Co.**, of Clearwater, for $3,406,790. **Tobin Quarries, Inc.**, of Kansas City, Mo., has $2,839,940 contract for riprap on dam in Nebraska. Contract for airport grading in Charleston, W. Va., went to **Harrison Construction Co.**, of Pittsburgh, for $2,547,830. Contract for runway paving at Idlewild, N. Y., was awarded to **A. I. Savin Construction Co.**, of East Hartford, Conn., for $2,203,945. **H. L. Coble**, of Greensboro, N. C., has $1,570,500 Navy contract for barracks at Cherry Point. **Rob. E. McKee**, of Los Angeles, Calif., will build naval air station at El Toro for $1,500,000. Low bid of $1,497,000 for filtration plant in Chicago, Ill., was submitted by **S. N. Nielsen Co.**, of Chicago. **American Bridge Co.**, of Washington, D. C., has $1,392,535 Navy contract for bridge crane runway at Hunters Point, Calif. Navy contract for classification yard at Port Chicago, Calif., went to **MacDonald & Kahn, Inc.**, of San Francisco, for $1,336,068. **H. E. Wolfe Construction Co.**, of St. Augustine, has $1,000,000 Navy contract for runways at Glynco, Ga.

HIGHWAYS

Among recent highway contract awards are the following: California: $727,858 to **Lord & Bishop** and **A. Teichert & Co.**, of Sacramento. Colorado: $262,901 to **Lowdermilk Bros.**, of Denver. Georgia: $238,367 to **John Monaghan, Inc.**, of Pelham. Illinois: $623,389 to **J. C. O'Connor & Sons, Inc.**, of Fort Wayne, Ind.; $566,458 to **White Consolidated, Inc.**, of Chicago; and $598,223 to **Arcole Midwest Corp.**, of Chicago. Nebraska: $515,935 to **Peter Kiewit Sons Co.**, of Omaha. New Jersey: $699,048 to **Fred Berlanti & Son, Inc.**, of Harrison, N. Y. Tennessee: $410,799 to **Wm. F. Bowe & Co.**, of Augusta, Ga. Texas: $444,938 to **Bell & Braden**, of Amarillo. West Virginia: $252,212 to **Veceillio & Grogan**, of Beckley.

Copyright, 1944 — Established 1919

McGraw-Hill Publishing Co., Inc., 330 West 42nd St., New York (18)

Construction Methods

A Pictorial Survey of Current Practice, Equipment and Materials

JOHN ABBINK, Publisher

ROBERT K. TOMLIN, Editor — A. E. PAXTON, Manager

Editorial Staff: Vincent B. Smith, Paul Wooton (Washington) N. A. Bowers (San Francisco) Nelle Fitzgerald Patricia McGerr

NOVEMBER, 1944

THE *How* OF IT

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

McGRAW-HILL PUBLISHING COMPANY, INC., 330 WEST 42d STREET, NEW YORK (18), N. Y.

JAMES H. McGRAW, Founder and Honorary Chairman

Editorial and Publishing Offices: 330 West 42nd St., New York (18); 520 North Michigan Ave., Chicago (11); 68 Post St., San Francisco (4); 738-9 Oliver Bldg., Pittsburgh; Aldwych House, London, W. C. 2, England. Branch Offices: Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Los Angeles; Atlanta, Ga.

JAMES H. McGRAW, JR., President — **HOWARD EHRLICH**, Executive Vice-President for Business Operations — **JOHN ABBINK**, Executive Vice-President for Editorial Operations

CURTIS W. McGRAW, Vice-President and Treasurer — **JOSEPH A. GERARDI**, Secretary — **J. E. BLACKBURN**, Circulation Manager

CONSTRUCTION METHODS, November, 1944. Volume 28, Number 11. Published Monthly, price 1 copy. Return Postage Guaranteed. Allow at least ten days for change of address. All communications about subscriptions should be addressed to the Director of Circulation, 330 West 42nd Street, New York (18), N. Y. Subscription rates—United States, Mexico and Central and South American countries, $1.00 a year, $1.50 for two years, $2.00 for three years. Canada, $1.50 a year, $2.50 for two years, $3.00 for three years. Great Britain and British Possessions, 12 shillings a year, 36 shillings for three years. All other countries, $2.00 a year, $6.00 for three years. Entered (or will be entered) as second class matter December 16, 1936, at the Post Office of New York, N. Y., U. S. A., under the act of March 3rd, 1879. Printed in U. S. A. Cable address: "McGrawhill, New York." Member of A. B. P. Member of A. B. C.

CHANGE OF ADDRESS

McGRAW-HILL PUBLISHING COMPANY
330 West 42nd Street, New York (18), N. Y.

Director of Circulation:

Please change my address on Construction Methods

From .....

.....

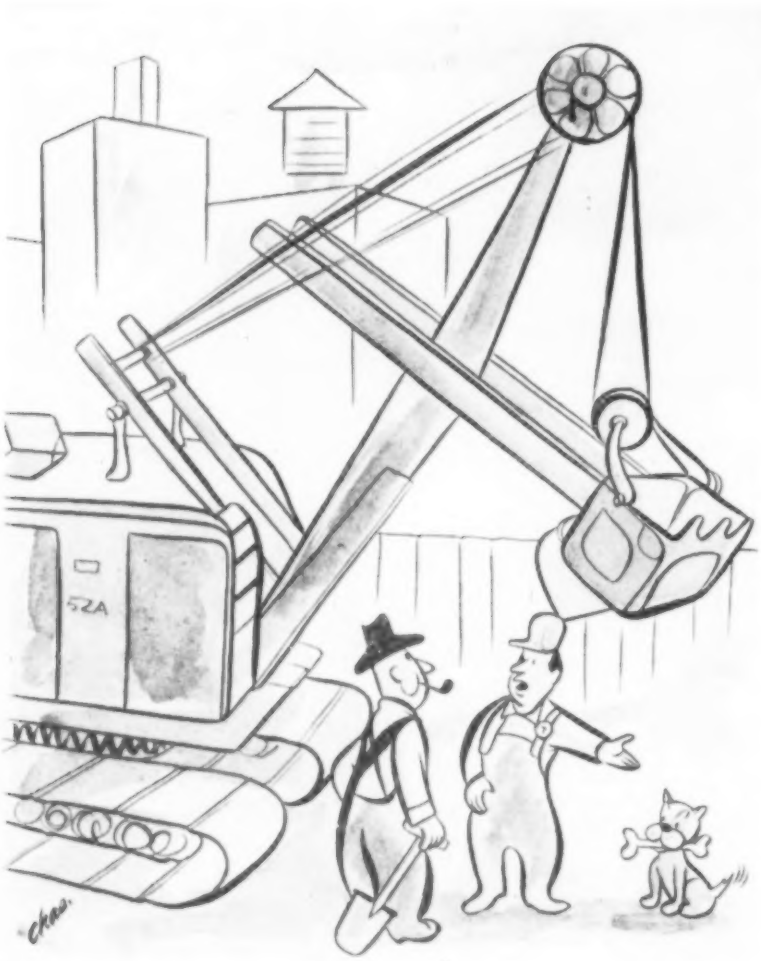
To .....

.....

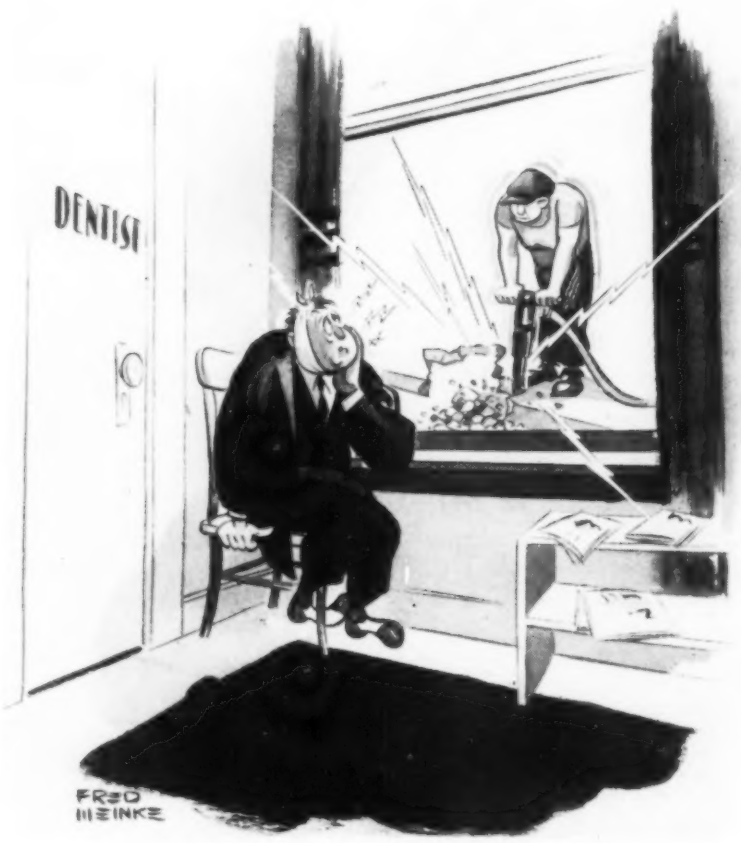
THE JOB JESTER

CARTOONS DRAWN FOR CONSTRUCTION METHODS

"I don't care if Tech is short of manpower. It ain't ethical substituting machinery!"



"He keeps following me around."



According to Plan

SUCCESSFUL building jobs, like military campaigns, go according to plan. Advance planning and teamwork do the trick. This dependable team—Lone Star Cement and 'Incor' 24-Hour Cement—wins through with economical job speed at minimum cost. *Estimate for each job, or various parts of the same job, the cement which shows the lower cost—forms, time, heat-protection and cement all considered.* Where dependable high early strength shows a net saving, use 'Incor'*; for other parts of the structure use Lone Star Cement. That's selective concreting—and it saves a lot of hard, cold cash. Write us at 342 Madison Ave., New York 17, for "Winter Concreting Book."

*Reg. U. S. Pat. Off.

PLAN IT FOR QUALITY, SPEED, ECONOMY

· Estimate each job with BOTH Lone Star Cement and 'Incor' 24-Hour Cement
Results since 1927 prove 'Incor' advantages on—

WINTER WORK
at summer speed . . . cut heat-protection costs . . . less forms and tarps.

STRUCTURES
24-hour form removal . . . 50% less forms . . . no reposting, earlier use.

WATERTIGHT CONCRETE
dense and durable, 5-7 days less curing . . . easier-placed mixes.

HEAVY-DUTY FLOORS
ready for use in 24 hours . . . non-dusting, greater wear-resistance.

LONE STAR CEMENT CORPORATION

Offices: ALBANY • BIRMINGHAM • BOSTON • CHICAGO • DALLAS • HOUSTON • INDIANAPOLIS • JACKSON, MISS. KANSAS CITY, MO. • NEW ORLEANS • NEW YORK • NORFOLK • PHILADELPHIA • ST. LOUIS • WASHINGTON, D. C.

LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 15 MODERN MILLS, 25-MILLION BARRELS ANNUAL CAPACITY

...when contractors and users of heavy construction equipment *will* be able to obtain delivery of new equipment.

When that day comes, Byers will be ready to offer their many customers and prospective customers a variety of newly engineered, tested and perfected postwar shovels and cranes, draglines and trench hoes that are powerful, fast and modern. They are now being used on war work, by war contractors and by the armed forces.

Never before have Byers new models had so extensive, thorough and prolonged a test period before being offered for general sale. Some have been operated for three years under wartime conditions by their present owners. Some have worked two and three shifts daily, providing our engineers with data that results in improved products you will be eager to own and use.

Government wartime restrictions have given us the time and opportunity to achieve these results. With complete confidence Byers is now planning for converting to quantity production on these new postwar models as soon as physically possible. When the day comes to announce them, you will realize that this advanced engineering could only have been the result of a long and carefully planned program . . . a program to provide you with better values in shovels and cranes.

We then ask you to consult your nearest Byers dependable distributor who will be fully equipped to explain and demonstrate to you the many advantages of new Byers shovels and cranes.

THE BYERS MACHINE CO.

★ Ravenna, Ohio ★

Distributors throughout the World

"Made to Order" for MORE PAY DIRT PER DAY

HERE ARE THREE REASONS WHY EUCLIDS CUT HAULING COSTS

DEPENDABILITY . . . Both Rear-Dump and Bottom-Dump EUCLIDS are built from the bottom up for heavy duty off-the-highway service. Continuous performance records on hundreds of the toughest mining and construction jobs are evidence of superior design, rugged construction and painstaking production.

VERSATILITY . . . Haul earth, rock, coal and ore with ample power for steep grades and difficult hauls . . . fast, easy loading with efficient loading equipment — shovels, draglines, elevating graders or transfer bins . . . quick, clean dumping on the fill or into hoppers.

EFFICIENCY . . . Pay loads of 15 to 30 tons hauled at top speeds of 21.8 to 34 m.p.h. . . . fast loading by efficient digging equipment, coupled with Euclid capacity and speed, results in lower cost per yard and increased production on all lengths of haul.

Compare Rear-Dump and Bottom-Dump EUCLID performance with other combinations or types of hauling equipment and you will know why leading contractors and industrials use efficient digging and loading tools and Euclid hauling equipment to keep costs down on both long and short hauls. Your Euclid distributor will be glad to supply helpful facts and figures for your hauling requirements.

The EUCLID ROAD MACHINERY Co. · · · Cleveland 17, Ohio

EUCLID SELF-POWERED HAULING EQUIPMENT For EARTH . . ROCK . . COAL . . ORE

TRAXCAVATE

THE MODERN DIRT and MATERIAL HANDLING METHOD

Two of the fleet of TRAXCAVATORS owned by a prominent Chicago excavating contractor.

That's the way to get digging, loading, grading, and carrying jobs done quickly, at lowest cost! TRAXCAVATORS are modern tractor excavators that combine in one machine the usefulness of a shovel, loader, scraper, bulldozer, etc. They move around jobs easily under their own power; can readily be transported on streets and highways. Powered by "Caterpillar" track-type tractors, with bucket capacities from ½ to 2½ cubic yards. Bulldozer blade quickly interchangeable with the bucket; other attachments also available. Your Trackson-"Caterpillar" dealer will be glad to show you, in interesting facts and figures, why TRAXCAVATOR users say, "Traxcavate!" Or, write for literature to TRACKSON COMPANY, Milwaukee 1, Wisconsin

BACKFILLING Concrete Wall

DIGGING and LOADING

MATERIAL HANDLING

TRAXCAVATOR

The Original Tractor Excavator

Photo courtesy of The Studebaker Corp.

Cars on snowshoes

A typical example of B. F. Goodrich development in rubber

WHEN there was danger that the Japs might invade Alaska the army needed a new kind of vehicle to travel fast on deep snow—or on ice, through water, swamps or on hard roads. It had to have "tank treads", not wheels, and it had to be so light it would "float" on snow.

B. F. Goodrich men had developed light rubber-covered treads for "half-track" vehicles, but even those were too heavy. Could they be made much lighter? Could "fins" be added to push against snow, but which still wouldn't touch ground on a hard road? Could they get the answers *quickly?*

For fastening rubber to metal, rubber men had always used *molds*—and molds took six months to make. B. F. Goodrich developed a method of blowing the rubber on the metal with compressed air. It was faster and worked just as well. They designed new treads while an automobile company was designing the machine itself. The "weasel", as it is called, is one of the fastest things *off* wheels. They used it in France instead of Alaska, but the snowshoes turned out to be the best kind of sandshoes and mudshoes.

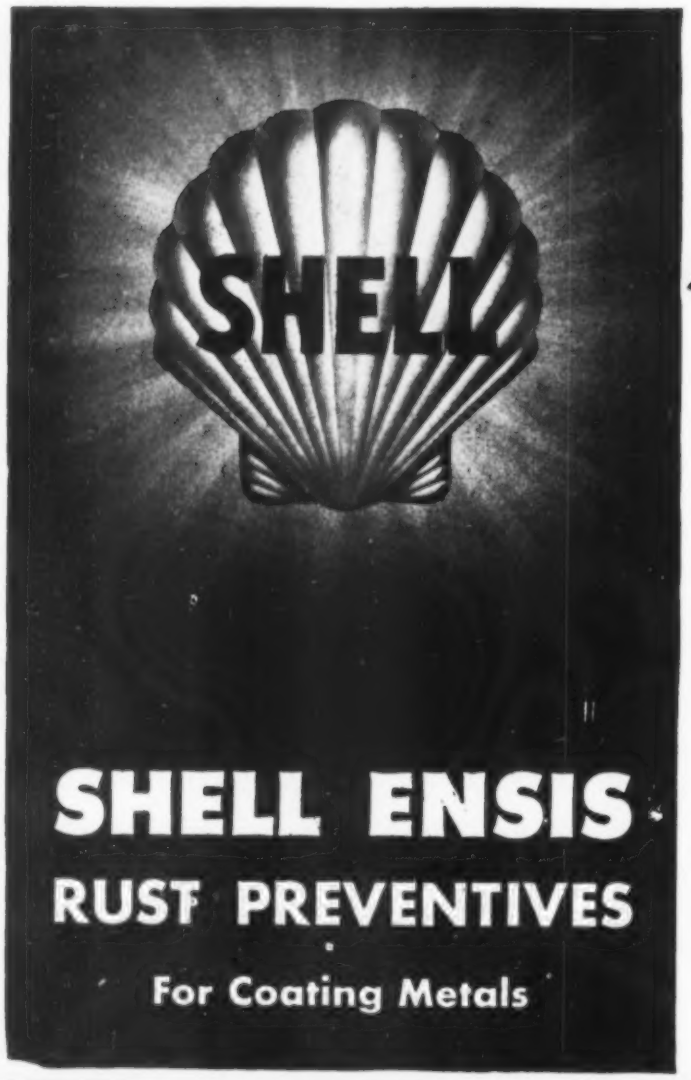
B. F. Goodrich research goes on in war or peace and applies to every kind of tire—passenger-car, truck, farm, industrial. No tire is too good to be improved or too standardized to change when needs of users or materials available have changed.

Urgent military needs like this have caused a temporary shortage of truck tires. During that shortage, B. F. Goodrich dealers offer you special service to help make your present tires last longer. Let them help you, and when you must have new tires get those backed by this policy of constant improvement. The B. F. Goodrich Company, Akron, O.

B.F. Goodrich
Truck & Bus Tires

At Last!—a line of i

PREVENT



FOR YEARS AMERICAN INDUSTRY has paid tribute to demon rust to the tune of $1,000,000,000 a year. Rusting of lubricated surfaces has been "put up with" as a necessary evil.

Shell scientists and engineers, working with steam turbine manufacturers, did the "impossible"... developed a rust-preventive turbine oil.

Using the wealth of knowledge gained by developing and perfecting this oil, Shell's Research Laboratories then focused their efforts on developing a similar line of rust-preventive oils for general industrial purposes. The result is the new Shell Tellus Oils for machine lubrication and the new Shell Ensis Rust Preventives for coating metals.

The new Shell Tellus Oils are not designed to *remove* rust. They will not eliminate all existing rusting conditions that may be present in your machines. But where moisture is a factor, the new Shell Tellus Oils, because of the special rust-inhibiting qualities built into them, afford unequaled protection against the formation of rust ... and without the sacrifice of other valuable

# of industrial products to

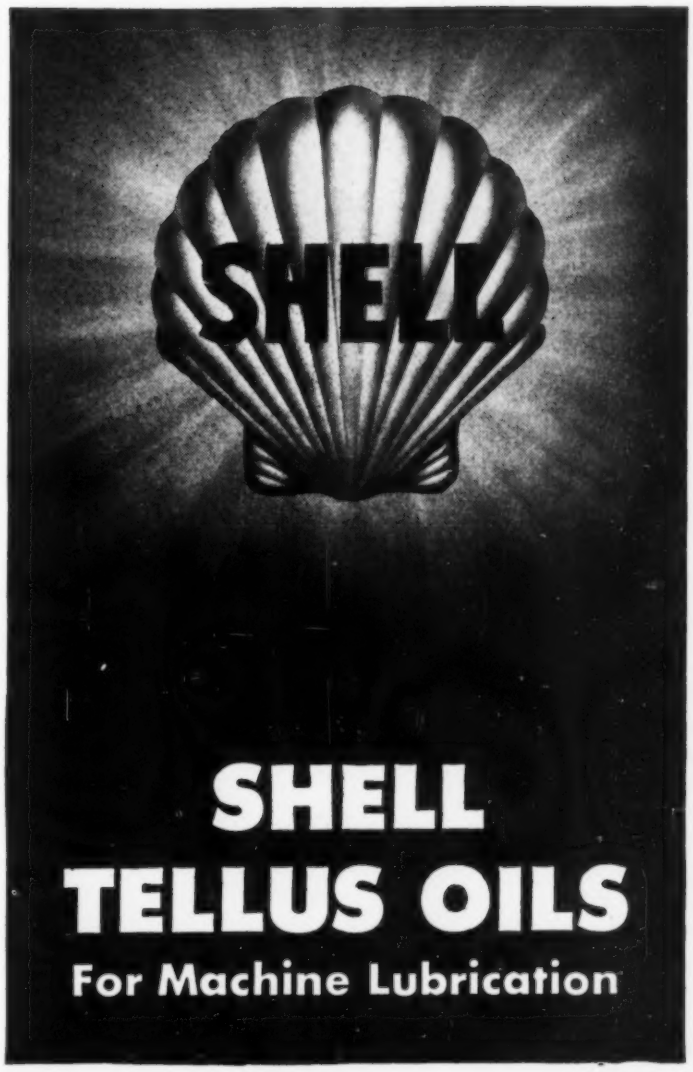
RUST!

characteristics. They form a protective film that coats the metal, making it highly resistant to water and moisture. Shell Tellus Oils also have superior oxidation stability.

The new Shell Ensis Rust Preventives cover a complete line of oils, coatings and compounds. They are available in a number of grades, designed to give protection against the dangers of exposure, which range from the extreme effects of rain and snow during outdoor storage, to the mild humidity conditions encountered in the factory between machining operations. The protective coatings formed by Shell Ensis Rust Preventives graduate from the extremely thin, transparent oil films that need not be removed, to the heavy, abrasion-resistant coatings which will withstand severe weathering conditions over long periods of time.

* * *

Call in the Shell man now! After a thorough study of your operation he will recommend the Rust-Preventive Product best suited to your specific conditions. Write, wire or phone Shell Oil Co., Inc., 50 West 50th Street, New York 20, N. Y., or 100 Bush Street, San Francisco 6, Calif.



Excavating . . .

WET or DRY

Your excavating problems—whether they involve millions of yards of underwater excavation or peeling off miles of overburden — are never too big for profitable solution with Bucyrus-Erie machines. In dredging as in dry land excavating, you need designed-for-the-job Bucyrus-Eries to get the most in output — and profit. For profit-to-you is the natural result of Bucyrus-Erie's policy, continued for more than 60 years, of studying your needs and manufacturing machines that are **RIGHT** for your work.

That's why Bucyrus-Eries predominate on the toughest excavating jobs — wet or dry — all over the world . . . why **you'll** profit most by using Bucyrus-Erie excavators.

V-37-10

ARMY E NAVY

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN, U. S. A.


You wouldn't
S. Berger

CUT DOWN OVERHAULS

—SAVE ENGINE CLEANINGS!

THAT'S HOW SOCONY-VACUUM'S DELVAC OILS HELP KEEP ENGINES ON THE JOB! These special oils are recommended for all automotive-type Diesels and heavy-duty gasoline engines. Have high resistance to formation of sludge and lacquer. They guard against corrosion of hard-alloy bearings. Save manpower, "out-of-service" time! GET DELVAC OILS for your equipment!

OTHER SOCONY-VACUUM TIME-SAVERS:

MOBILUBE "V"—A special short fiber, soda soap grease developed primarily for wheel bearings and grease-type universal joints, but also recommended for clutch release bearings and other parts operating at high temperatures. Remarkably efficient and long-lasting. Recommended for year-around use.

MOBILUBE GEAR OILS—These highly stable, straight mineral oils are made specially for heavy-duty service. They are free of abrasives, soaps, fillers, foreign materials of any kind—will not thicken excessively when cold. Offer superior protection against "scuffing," "galling"—dangerous gear wear!

Talk with your Socony-Vacuum Representative

Mobilgas
SOCONY-VACUUM

USE SOCONY-VACUUM FUELS, LUBRICANTS, AND ENGINEERING SERVICE!

KEEP ENGINES "ON SCHEDULE" WITH SOCONY-VACUUM'S FAMOUS

DELVAC *Heavy-Duty* OILS

SOCONY-VACUUM OIL CO., INC., and Affiliates: Magnolia Petroleum Co., General Petroleum Corp. of Calif.

In the hedgerows of Normandy

A "NEW" WEAPON WAS BORN!

Signal Corps Photo

ANOTHER LAPLANT-CHOATE CONTRIBUTION TO VICTORY

For a time the going was plenty tough in Normandy. Just as Hitler had figured, the ageless hedgerows stopped Allied tanks cold, preventing any major advance from the beachhead. Then all of a sudden, American forces unleashed one of the most potent "secret" weapons of the entire war—a powerful Tank-Dozer—developed and built by LaPlant-Choate—in cooperation with Army Engineers and Ordnance.

Consisting of a rugged dozer blade ingeniously mounted on an M-4 tank, this modern juggernaut combines the best features of both machines—the terrific work-power of the bulldozer, plus the fire-power, speed and armored protection of the medium Sherman tank. An almost unstoppable combination!

Spearheading the attack in France, swarms of American Tank-Dozers knifed through the hedgerows and "bocage" country like papier mache—plowing out land mines . . . destroying enemy pill boxes . . . bulldozing their way through or over every obstacle the Nazis could muster. Next stop: "Berlin and Tokyo!"

As one of the nation's oldest and largest manufacturers of earthmoving equipment, it has been LaPlant-Choate's privilege to work closely with the Army in developing and producing many important items of engineer-equipment. Included in this list are thousands of fighting bulldozers . . . small air-borne dozers and scrapers . . . special beach-dozers for invasion beaches and tree-dozers for clearing heavy jungles. All are weapons of war today but soon we hope many will become tools of peace. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

ARMY (E) NAVY

LAPLANT-CHOATE

Earthmoving and Land Clearing Equipment

YOURS

FOR TOMORROW'S HEAVY-DUTY, HIGH-SPEED HAULING

• THE "CATERPILLAR" DIESEL DW-10 TRACTOR

ON GIANT construction jobs from coast to coast, hundreds of "Caterpillar" Diesel DW-10 Tractors have long been proving their advantages for high-speed, heavy-duty hauling. These versatile, powerful prime movers have fitted so many tasks so well that the demand has always exceeded the supply.

There are sound reasons for this outstanding record, some of which are outlined below at right. Other advantages are to be found in the design of the machine itself and the organization that builds and services it.

From bumper to final drive, it is a "Caterpillar" machine—built and backed by one manufacturer. The DW-10 is designed solely as a high-speed, heavy-duty hauling unit that will deliver maximum yardage on a long haul with real profit to the owner and complete safety for the operator. Available for it are matched scrapers and wagons that take full advantage of its power and speed. Its "Caterpillar" Diesel engine, like its five-speed transmission, high-traction final drive and sturdy box section frame, are all specially designed and built for this one machine. Add to this its scientific weight distribution, maximum loading pressure, short turning and low center of gravity and you have a real picture of its speed and safety.

Like all "Caterpillar" products, DW-10 Tractors have been available only for war-essential work. When the factory is permitted to resume production for unrestricted uses, these machines will be ready to solve high-speed hauling problems everywhere. Your "Caterpillar" dealer has full information on these modern hard-working earthmovers. He'll be glad to share it with you.

CATERPILLAR TRACTOR CO., PEORIA, ILL.

"Caterpillar" Diesel DW-10 Tractor with 8.5-yard scraper being pushdozer loaded with "Caterpillar" D8 Tractor on a muddy Army airport in California.

"Caterpillar" Diesel DW-10 Tractor and 8.3-yard W-10 Wagon hauling from shovel on a railroad job in Maryland.

- Five forward speeds —2.4 to 18.1 m.p.h.
- Six-cylinder "Caterpillar" Diesel engine
- "Finger-tip" power steering
- "High-traction" differential
- Power brakes
- Short turning
- Full-floating, upholstered seat
- High clearance
- Constant mesh transmission
- Matched equipment
- 8.5-yard scraper*
- 8.3-yard wagon*

*Struck measure

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

TRACTORS · ENGINES AND ELECTRIC SETS · EARTHMOVING MACHINERY

F. C. Daugherty,
Duluth, Commissioner of Public Works

"THE MOST VERSATILE MACHINE WE HAVE . . . "

Says Mr. Daugherty about the

ATHEY MOBILOADER

"ANYTIME of the year, you'll find our Athey MobiLoader busy on an important job. It's the most versatile machine in our shop and we're proud of it," writes F. C. Daugherty, Duluth, Commissioner of Public Works.

Aggressive Duluth, Minnesota—"the air-conditioned summer-time city"—solves its multitude of loading jobs with an Athey Mobiloader.

Purchased in July, 1942, it has seen month after month of steady service in stock pile loading, grading alleys and sidewalks, street improvement and snow clearing.

Hundreds of Athey MobiLoaders are serving contractors, municipalities, coal mines, sand and gravel plants, U. S. Armed Forces, ore operators, and others today in many localities.

Simplified and improved after four years of performance proof in the field, Athey MobiLoaders are cutting loading costs and increasing loading production.

Why not investigate the Athey MobiLoader for your present "Caterpillar" Diesel D4 or D8 Tractors, in case new tractors are not now available? See your ATHEY-"Caterpillar" Dealer today, or write Athey Truss Wheel Co., 5631 W. 65th St., Chicago 38, Illinois.

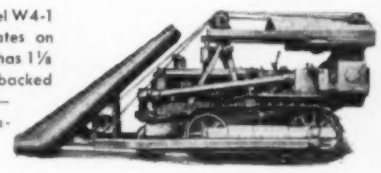
BUSY THE YEAR 'ROUND, the City of Duluth's Athey MobiLoader handles all materials from gravel to snow.

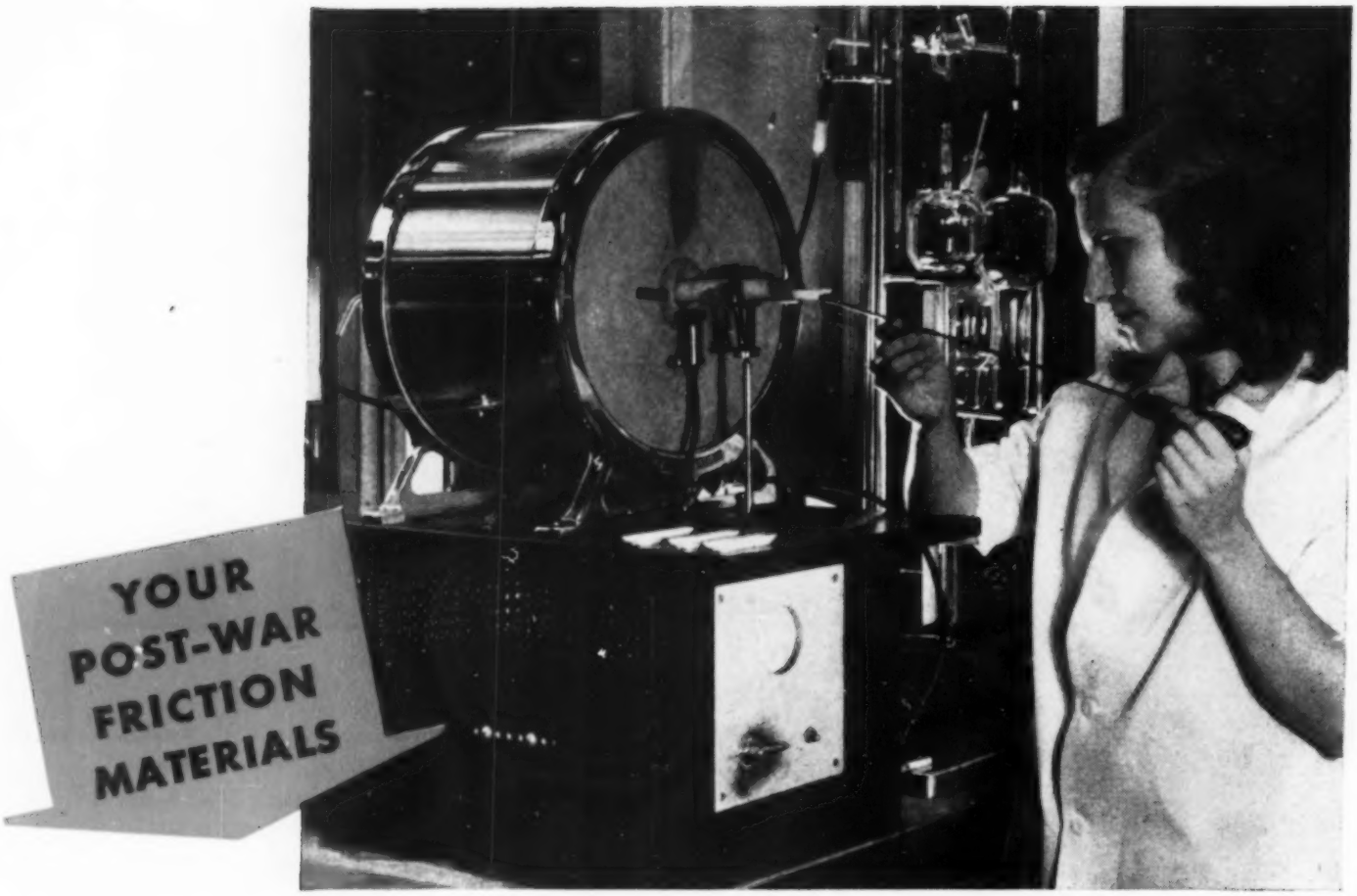
☆

ATHEY

IMPROVED MOBILOADER

Here is the new, improved Model W4-1 Athey MobiLoader. It operates on the "Caterpillar" D4 Tractor, has 1⅛ cubic yard bucket capacity. It's backed by 4 years of performance—hundreds of job-proved machines.





...are being perfected NOW!

MEASURING the exact amount of carbon in each Velvetouch formula, as shown in the photograph above, is only one of many controls by which we assure uniformity of quality. Our laboratories are engaged in never-ending research to improve still further the friction qualities of Velvetouch *all-metal* clutch facings and brake linings . . . so that your earth-moving equipment will start and stop more smoothly, more dependably.

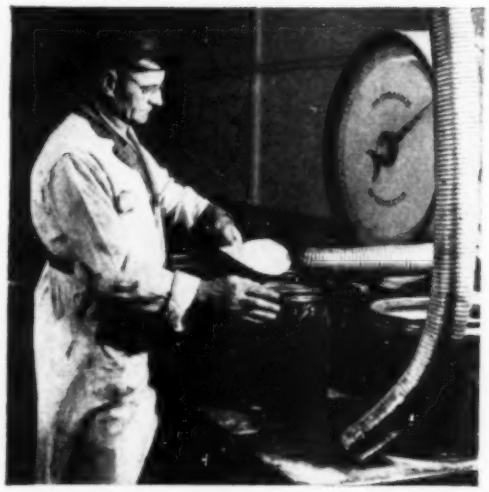
THE S. K. WELLMAN COMPANY

1374 EAST 51st STREET • • CLEVELAND 3, OHIO

Velvetouch is *all metal*—a combination of powdered metals, compressed, sintered and welded to a solid steel backing.

For Brake and Clutch . . . Use Velvetouch

The "INSIDE STORY" of POWDER METALLURGY



CHAPTER 1. Powdered metals—iron, lead, tin, etc.—first are carefully blended in the right proportions for each type of brake and clutch. After thorough mixing, they are ready for the molding and sintering operations.

Porto-Power—the Miracle Tool with 1001 Applications

Lifting heavy loads from 1½" starting point . . . All directional application of force in production operations . . . General industrial maintenance service . . . Reshaping damaged sheet metal spread springs . . . Push out pre-fitted and rusty parts . . . Remove cylinder heads . . . Straighten rods . . . Pull wheel hubs . . . [illegible] floor structures . . . Reshape turret tops and body sections of trucks and motor vehicles . . . Align frames of vehicles . . . Spread crushed sheet metal . . . Align parts for welding . . . General rebuilding, repairing and reconditioning service in maintenance of motor vehicles, machine tools, implements and construction equipment . . . Align machinery . . . Pull drive pulleys . . . straighten line shafts . . . Bend pipe . . . Lift heavy weights . . . Push out dented metal panels . . . Straighten bent frames of equipment . . . Push over walls . . . Pressing operations . . . Bend angle iron . . . Service [illegible] operations . . . Push back cave-ins . . . Riveting operations . . . Lift oil derricks . . . Straighten warped bed frames drilling machinery . . . Separate dies . . . Clamp parts for welding . . . Pull and insert gears . . . Test of materials . . . Pulling ship plates together for welding . . . . Press to pre-determined pressures . . . Test internal-pressure strength of vessels . . . Power unit for aviation jacks . . . Pull and insert shafts . . . Test load-bearing qualities of soil . . . Power units for shop-built or standard presses . . . Lift cranes off track for maintenance . . . Push out turret lathe tool-holders . . . Straighten foundry flasks . . . Pull wheels . . . Force freight car doors . . . Block up cargo . . . Remove and install sprockets, gears, pulleys and cat-heads on oil drilling machinery . . . Pull well casing . . . Rescue work . . . Straighten railway cars . . . Shoring bilge plates into position for welding . . . Lining up decks for insertion of supports and welding . . . Press plastics . . . jack operations . . . Insert and remove bushings . . . Spread crushed material containers . . . Straighten metal concrete forms . . . General service in building construction . . . Spread heavy malleable conveyor links for replacements . . . Emboss metal signs . . . Push header sections or temporarily support roof shields in tunneling . . . Tighten anchor chains and cable on drillers . . . Pull and insert pins . . . Punch metal . . . Straighten bent building posts . . . buildings . . . Align plates for welding in shipbuilding . . . Force hatches . . . Remove tractor, truck and [illegible]s . . . Pulling pins from rudder assembly . . . [illegible]pes and straightening shafts.

A thousand tools in one*—that's Porto-Power! It does so many tough jobs—*does them safely, easily and quickly*—that the demand for this miracle hydraulic tool has doubled—*yes, trebled!

Plants that had one Porto-Power now have a dozen or more! Production men, seeing Porto-Power doing tough jobs so easily, have *wired* their orders.

New uses are being discovered every day. The ingenuity of *its users* is as astounding as the versatility of Porto-Power itself!

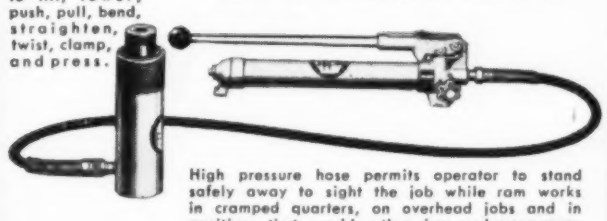
You, too, can use this "educated" hydraulic jack. It's available in 7, 10, 20 and 50-ton capacities. See your industrial supply distributor or mail the coupon.

A product of **BLACKHAWK MFG. CO. Milwaukee 1, Wis.**

A THOUSAND TOOLS IN ONE

All - directional hydraulic ram has attachments to lift, lower, push, pull, bend, straighten, twist, clamp, and press.

Hand-operated hydraulic pump needs no electrical or air hook-up. Use it anywhere.



High pressure hose permits operator to stand safely away to sight the job while ram works in cramped quarters, on overhead jobs and in positions that would, otherwise, endanger men.

BLACKHAWK

Hydraulic Equipment—Wrenches

Blackhawk Mfg. Company
Dept. P23114, Milwaukee 1, Wisconsin

Send catalog on Porto-Power and complete wartime Hydraulic Equipment line.

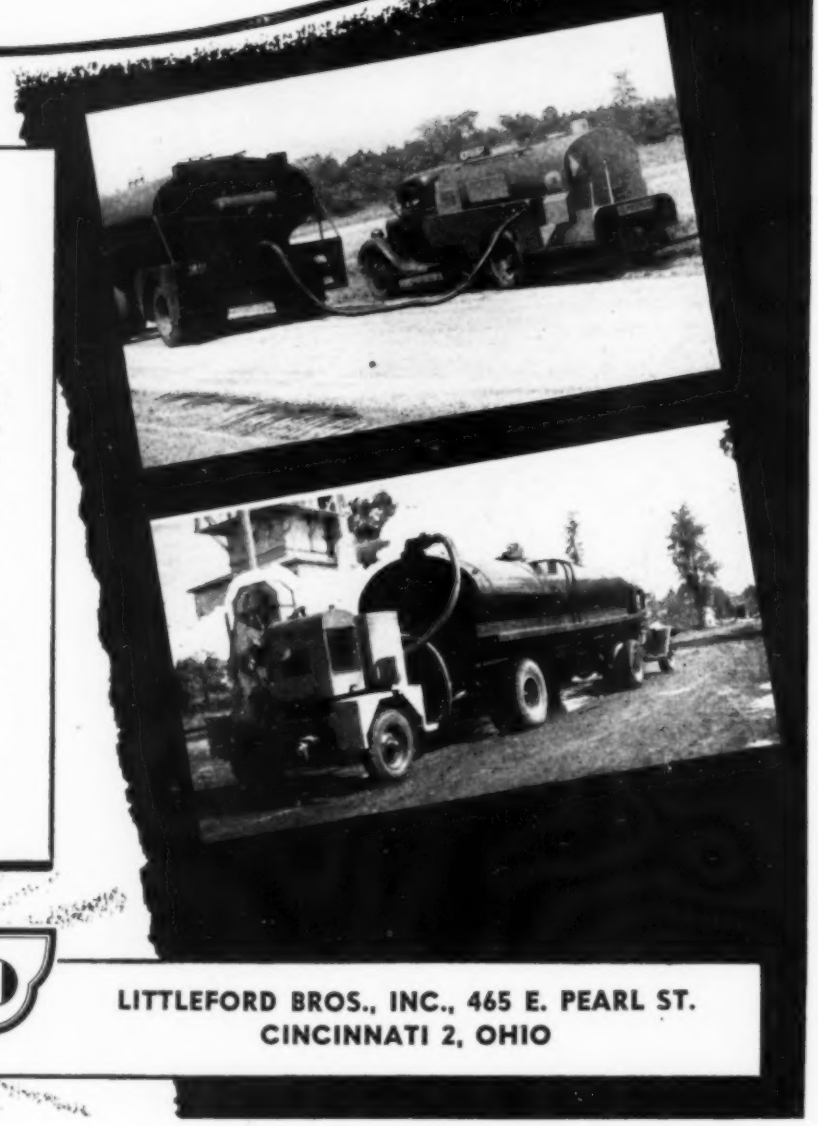
Name_____

Firm_____

Address_____

LITTLEFORD

SUPPLY TANKS



FRAMELESS CONSTRUCTION A NEW FEATURE

Haul Asphalt, Tar, Road Oils, or Emulsion to the job in a Littleford Supply Tank. Don't let the haulage problem slow up your application work—keep the Distributors spraying while the Supply Tanks make the long hauls. Littleford Supply Tanks are designed to do the material hauling more efficiently because they're equipped to take care of all types of materials. They are made with or without heating systems, transfer pumps, etc.

The new Littleford Frameless Construction eliminates the trailer frame; the tank is self supporting; the cost is less; the tank has better load distribution and lower center of gravity.

For Better Post War Road Construction and Maintenance, use the best in Equipment, use Littleford Black Top Road Construction and Maintenance Equipment.

LB LITTLEFORD

BLACK TOP ROAD MAINTENANCE EQUIPMENT SINCE · 1900

LITTLEFORD BROS., INC., 465 E. PEARL ST.
CINCINNATI 2, OHIO

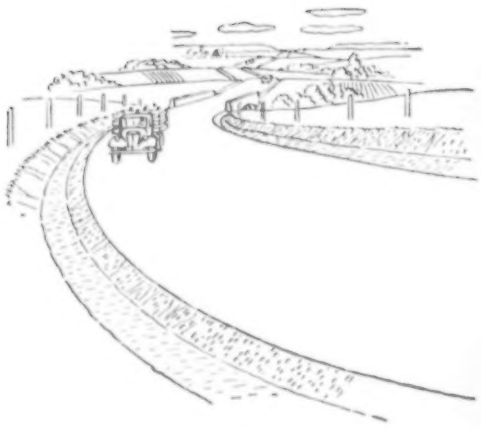
LET'S HELP PROVIDE JOBS!..

It's up to Us in the Highway Industry to help ward off a Breakdown of our Peacetime Economy

MR. CONTRACTOR . . Is your present equipment in condition? Could you put it to work . . . NOW? Have you talked to your dealer about additional units?

MR. ROAD OR STREET OFFICIAL . . Are your plans ready for bids? Can you start the ball rolling in your community without a moment's delay? YOU are the *key man!*

AS YOUR MANUFACTURER . . As one of your suppliers of construction machinery, we are happy to say we will have a wider and better line of units than ever before. Our plans for peacetime expansion have been made. As rapidly as the fortunes of war permit, you will get those powerful, fast-moving 2-cycle Diesel tractors with bulldozers and scrapers . . . motor graders, power units and other necessary tools — proved and improved by the rigors of war. But, as you would want it, until the war is unconditionally won in every theater, Allis-Chalmers will produce every machine possible to attain that end. Our policy is to "Work For Victory . . . and Plan For Peace!"



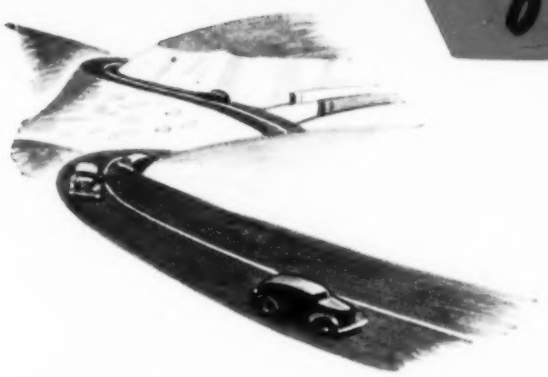
★

ALLIS-CHALMERS
TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

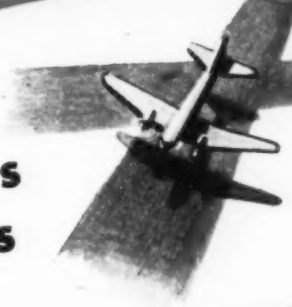
ECONOMY MUST BECOME THE NATIONAL WATCHWORD

A WOOD ROADMIXER CAN SAVE AS MUCH AS TWO-THIRDS IN CONSTRUCTION COSTS

ON THESE JOBS



- ROADS
- HIGHWAYS
- AIRPORTS



WITH THESE MIXES

- EMULSIONS
- ROAD OILS
- SOIL CEMENT

The Wood Roadmixer is a complete traveling mixing plant. It is pulled and powered by a standard crawler tractor and tows a binder supply truck. It uses low-cost native or local materials. It mixes in *one pass on the job.* Two men can handle an entire Wood Roadmixer unit and produce an average of 2,000 tons of mix per 8-hour day.

. . . These are the "built-in" features of a Wood Roadmixer. Combine these with a little common sense in design, preparation and finish and you have the answer to economical, low-cost, high quality pavement construction.

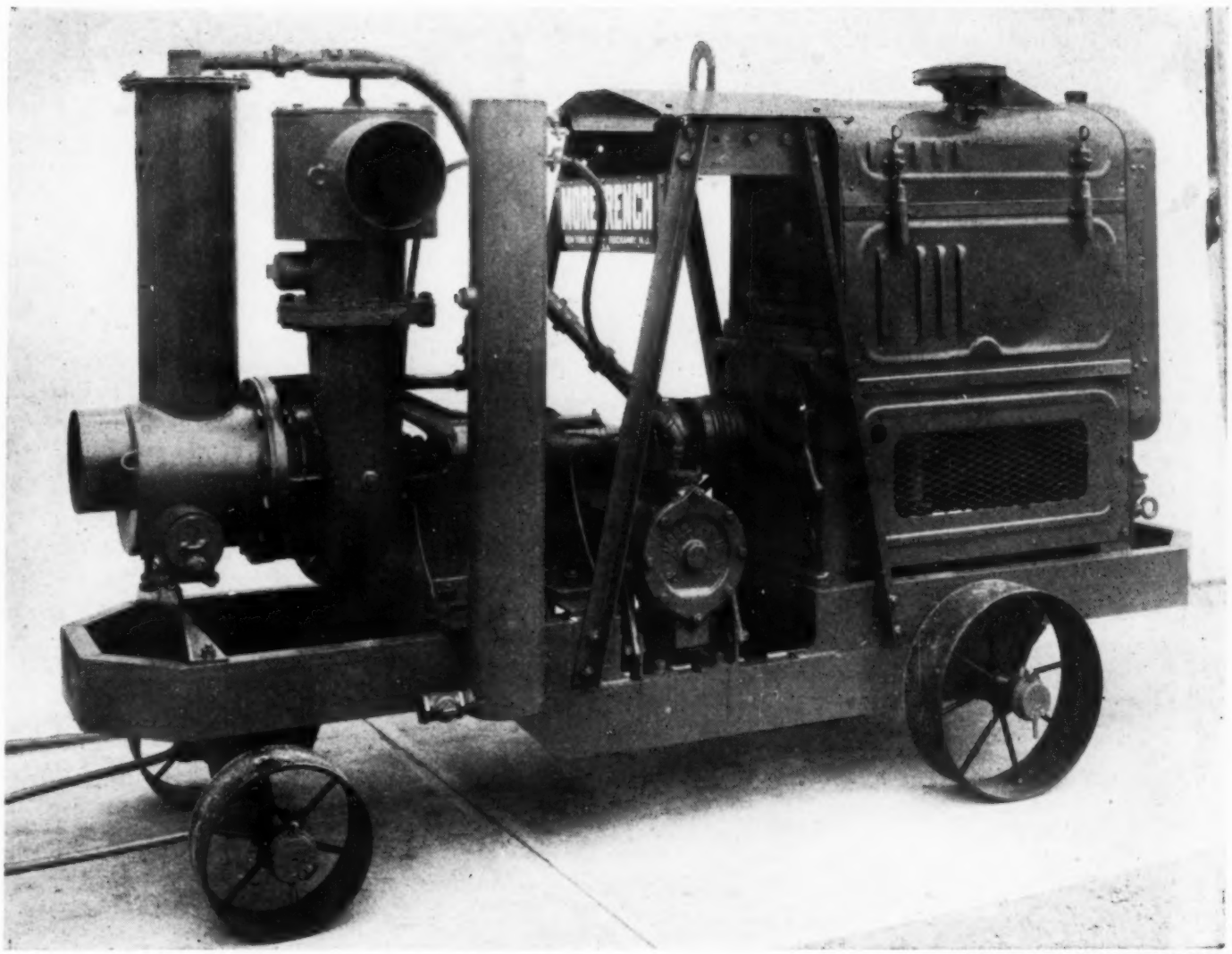
Wood Roadmixers will lay two miles of pavement for the cost of *one*—will make *one* dollar do the work of *two*. And that's important to you as an engineer, contractor or taxpayer. Because the day is coming when *economy must become the national watchword!*

Wood Roadmixers are built in two sizes. They are sold by leading equipment dealers everywhere. If there isn't a dealer in your territory, write us for literature and costs on the Wood Roadmixer—the pioneer and leading travel plant method of pavement construction.

DESIGN FOR ROAD-MIX

WOOD ROADMIXER

Wood Manufacturing Co. • 816 West 5th St., Los Angeles 13, California



8 INCH MORETRENCH PUMP

Why? Each year *more* contractors depend upon the MORETRENCH WELLPOINT SYSTEM to give them dry results at a fixed cost on their wet jobs.

One of the reasons for the success of Moretrench predrainage is the MORETRENCH WELLPOINT PUMP. Built specifically for wellpoint operation, it is tops in operating efficiency, rugged enough to stand years of day in and day out service, and so constructed that when repairs are required they can usually be made on the job by any good mechanic. For specifications on all Moretrench Pumps, send for a copy of our catalog.

MORETRENCH CORPORATION

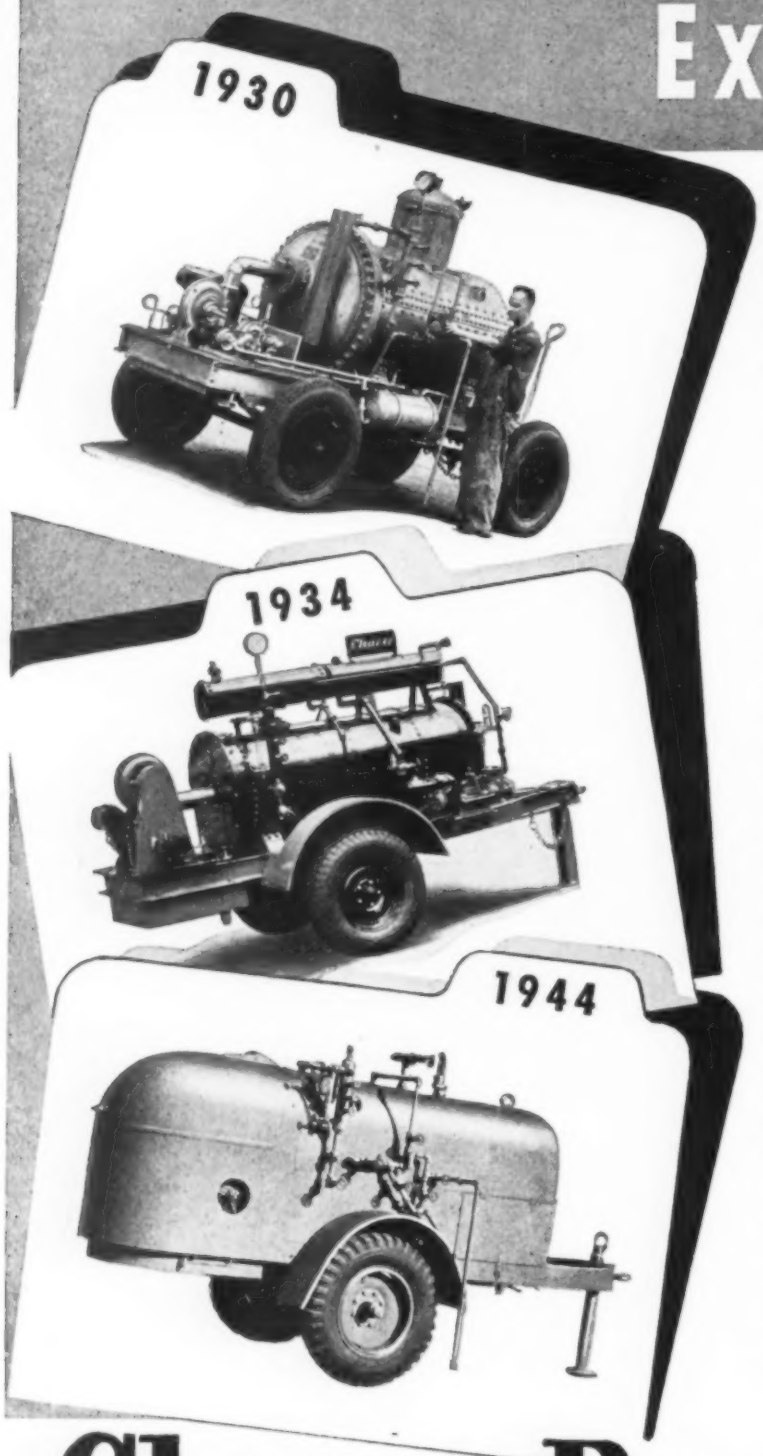
90 WEST STREET, NEW YORK 6

3037 SO. CHRISTIANA AVE.
CHICAGO 23, ILL.

ROCKAWAY, N. J.

321 EUTERPE ST.
NEW ORLEANS 11, LA.

YEARS OF SPECIALIZED EXPERIENCE . .



—— An Advantage That Has No Substitute In The Design and Construction of Mobile Heating Equipment

THE familiar expression "there is no substitute for experience" is exemplified in the trim, streamlined, highly perfected Cleaver-Brooks Tank Car Heater of today.

It shows unmistakable evidence of being the product of years of specialized experience dating back to the pioneer model of fourteen years ago. At the time this unit quickly replaced cumbersome "boilers" — set a high standard of speed and efficiency in heating bituminous material in tank-cars. Most of these original Cleaver-Brooks units are still in service—a real testimonial to inherently sound design and construction.

Experience counts — it is one of many reasons why Cleaver-Brooks is the best known name in mobile heating equipment. No other equipment equals Cleaver-Brooks in providing steam—with less fuel and water—no other equipment has the original and exclusive four pass down-draft flue travel and integral fuel-oil burner construction, plus the *perfected* positive dry-coil method of condensate return, which ends the "water-wagon" problem.

Get complete information now—send for bulletins or see your Cleaver-Brooks distributor.

CLEAVER-BROOKS COMPANY
5125 North 33rd Street
Milwaukee 9, Wisconsin

Cleaver-Brooks

PIONEERS AND ORIGINATORS OF

TANK CAR HEATERS . . . BITUMINOUS BOOSTERS . . . AUTOMATIC STEAM-PLANTS

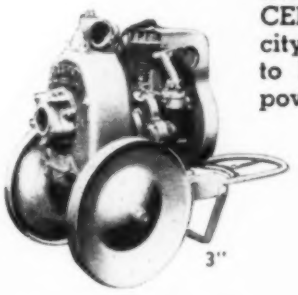
LOOK AHEAD WHEN YOU BUY

Guaranteed performance is *minimum* performance for JAEGER "Sure Prime" PUMPS

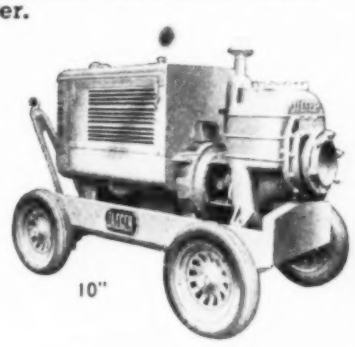
3000 Gallon "Bantam"

Contractors who watch their costs know there's a *big* difference between a Jaeger "Sure Prime" and an ordinary pump of the same size and rating. Jaeger Pumps are built to *exceed* their promises — deliver their rated capacity under tougher conditions, prime unfailingly and up to 5 times faster, assure you of thousands of *extra* hours of dependable cost-cutting service during the post-war building years ahead.

INDIVIDUALLY TESTED AND CERTIFIED for vacuum, capacity and pressure. Sizes 1½" to 10"; gas, electric or diesel power.



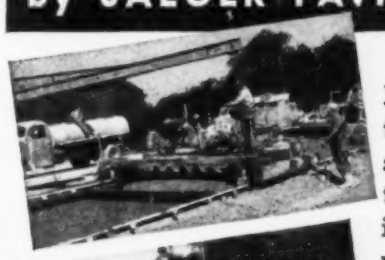
3"



10"

JAEGER DISTRIBUTORS in over 100 cities sell, rent and service "Sure Prime" Pumps.

Air-Entraining Cement REQUIRES QUICK FINISHING by JAEGER PAVING "TEAM"



Here's how "Construction Methods" describes the problem of the Horvitz Co. in laying 187,000 sq. yds. of vinsol resin cement behind a 34E dual drum paver on Ohio Route 237:

"The air-entraining cement produced a concrete which was almost free from surface bleeding, thus providing little water for lubrication during finishing. It was necessary to finish the concrete promptly, before the surface would become too dry, and this fact caused the finishers to work closely behind the mixer, avoiding long overtime at the end of the day and permitting the curing compound to be applied early to the slab. Prompt finishing was of particular advantage in the cool fall days.

JAEGER SCREW SPREADER and FINISHER — the team that broke the bottleneck behind the paver

When Jaeger originated and developed the mechanical Screw Spreader and Finisher as a paving team, modern paving became practical. Today contractors are able to operate one and even two 34E dual drum pavers, producing the stiffest vibratory mixtures or quick drying air-entraining cement, because of the almost unlimited capacity available for spreading and finishing behind the pavers.

Pavements and airport runways have also gained in strength and smoothness. Screw spreading eliminates segregation and produces a more uniform and denser slab texture; the Finisher, when working behind the Spreader, can concentrate on producing an accurately finished surface.

THE JAEGER MACHINE COMPANY

800 Dublin Avenue, Columbus 16, Ohio

"FLEET-FOOT" CRANE-LOADERS

"SPEEDLINE" MIXERS

"SURE-PRIME" PUMPS

"AIR-PLUS" COMPRESSORS

JAEGER *Engineered* EQUIPMENT

JAEGER-LAKEWOOD SPREADERS, FINISHERS AND BITUMINOUS PAVERS, FORMS, FORM TAMPERS—"DUAL-MIX" TRUCK MIXERS, AGITATORS—JAEGER HOISTING ENGINES, TOWERS

BRIXMENT *Assures More Economical Brickwork*

Aside from the cost of the brick itself, the most expensive item in masonry construction is the bricklayer's time.

Therefore the most economical mortar you can buy is the one that enables the bricklayer to lay the most brick per day. You cannot afford to give your bricklayer any mortar which causes unnecessary work, such as constant retempering, stooping to the board to replace mortar that failed to stick when he threw up the head-joint, etc. . . . To secure economical brickwork, the mortar must have excellent workability.

The plasticity of Brixment mortar is *ideal.* It approaches that of straight lime putty. It enables the bricklayer to do faster, neater brickwork, with the brick well bedded and the joints well filled.

This is the principal reason why Brixment reduces the cost of brickwork. In addition, less labor and supervision are required in mixing. No soaking or slaking. No mortar wasted. And it makes a neater job that costs less to clean down.

Mix a batch of 1-3 Brixment mortar (above) and a batch of 50-50 cement-lime mortar made with the same proportion of sand (below). Get any competent bricklayer to test them on the board—to spread them on the wall—to lay up a few brick with each of the two mortars. Then ask him which has the best workability!

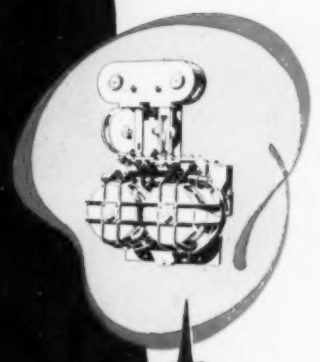
LOUISVILLE CEMENT COMPANY, Incorporated
General Offices: Louisville 2, Kentucky
Cement Manufacturers Since 1830

Ready Now!

TOMORROW'S KARRY-SKRAPER

KEEPING PACE WITH YOUR DEMANDS FOR FASTER DIRT MOVING, WE PRESENT A LINE OF KARRY-SKRAPERS THAT WILL MEET YOUR EVERY DEMAND FOR . . .

Fine Performance
Heaping Loads
Maneuverability



The Kable Power Unit that holds adjustment over longer periods of continuous operation. It's simple and dependable.

HERE ARE FEATURES YOU WANT IN TOMORROW'S SCRAPER

- Positive Ejection Gate that will not jamb when operating in clay or adobe.
- Front Apron not affected by raising or lowering the bowl while on way to fill.
- Cable protection against spill-over dirt no matter how high load is crowned. Insures long cable life.
- New Multiple Sheave Arrangement that gives true cable alignment. An effective cable and sheave saver.
- Ejection Gate that indicates the end of its stroke and eliminates a source of undue cable strain.
- Fairlead System on front of Karry-Skraper really leads fair no matter how short the turn.
- Neat Appearance and performance. We are proud of tomorrow's Karry-Skraper. You will be proud of it, too.

"Tomorrow" is not far off. Why not investigate this unit that will help you cut corners on dirt moving. See your tractor dealer or write us for complete information.

16 AWARDS M E IN WAR PRODUCTION

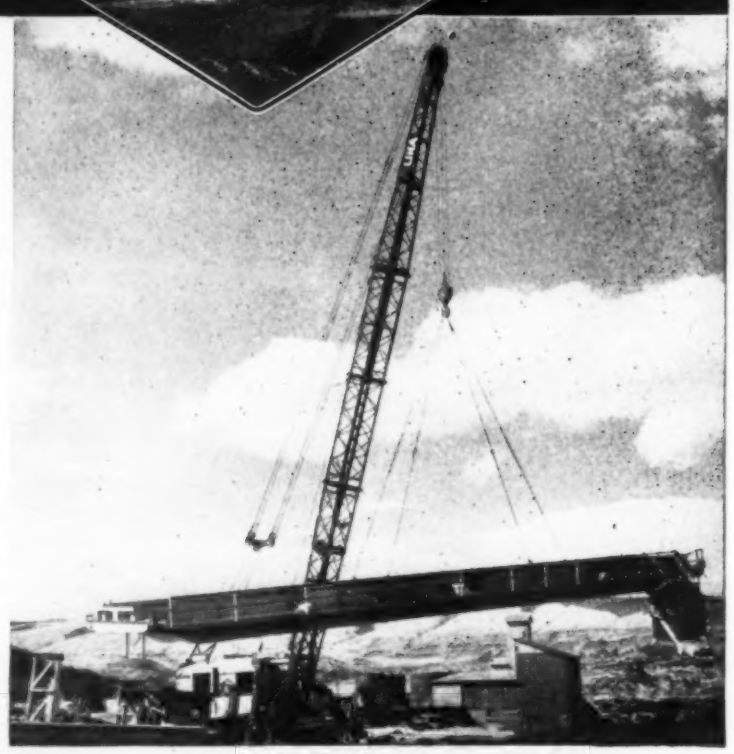
ISAACSON

Iron Works

SEATTLE

ENGINEERED TRACTOR EQUIPMENT

DESIGNED TO DO A BETTER JOB FASTER



Whatever may be your earth moving or material handling problem, you can depend on LIMA for the right size and type of Shovel, Crane or Dragline to do the job quickly and efficiently. LIMA excavators are manufactured in eight different sizes ranging from 3/4 cubic yard to 5 cubic yards. Crane capacities range from 13 tons to 100 tons. Dragline capacities vary, depending upon the nature of the work. Each unit, regardless of size, is ruggedly constructed for hard continuous usage. Every part is designed and built especially for the work the part is to perform. LIMA Shovels, Cranes and Draglines will give you a new conception of power, speed and efficiency on any earth moving or material handling job. Right now, practically our entire output is going to the Armed Forces. After victory your excavator needs will have our closest attention.

LIMA LOCOMOTIVE WORKS, INCORPORATED

Shovel and Crane Division - - LIMA, OHIO

NEW YORK, N. Y. PHILADELPHIA, PA. NEWARK, N. J. MEMPHIS, TENN. ST. LOUIS, MO.
DALLAS, TEXAS. PORTLAND, ORE. MINNEAPOLIS, MINN.
SEATTLE, WASH. SAN FRANCISCO, CALIF. LOS ANGELES, CALIF. SPOKANE, WASH.
MONTREAL, Quebec, Can. VANCOUVER, B. C.

LIMA SHOVELS CRANES DRAGLINES

SHOVELS, 3/4 YD. TO 5 YD. CRANES, 13 TONS TO 100 TONS
DRAGLINES, VARIABLE

Firestone TIRES SAVE YOU TIME AND MONEY-

FROM HERE

CONTRACTORS know that profits are the results of continuous operation. Trucks must roll with their load . . . and they have to be back to take their turns without delay. On these hauls Firestone Off-the-Highway tires will save you time and make you money.

These tires are ruggedly built to haul heavy pay loads. Extra strength cord bodies are specially built with each cord gum-dipped to withstand severe service. Double-thick sidewalls give extra protection against rutwear and snags. Extra tread plies cushion and protect the cord body against sharp impacts. The tread rubber is tough and cut-resistant.

Firestone, the pioneer builder of these big tires, has the advantage of more extensive research and actual field service. Because of this "know-how" Firestone tires stay on the job longer with increased profits to you.

☆ ☆

Listen to the Voice of Firestone with Richard Crooks and the Firestone Symphony Orchestra, under the direction of Howard Barlow, Monday evenings, over N. B. C.

TO HERE

Save the Surface with Proper Drainage

In postwar highway and airport construction planning, much thought is being given to proper drainage. Too many hard-surfaced roads and airfields of the past decade "cracked up" prematurely because of inadequate provision for disposal of storm water.

Exhaustive studies and tests made by the Portland Cement Association, the Clay Products Association, the Armco Culvert Manufacturers Association and other researchers have proved conclusively the need for thorough drainage. The wealth of authoritative information available assures future roads and landing fields of maximum permanence.

BUCKEYE TRACTION DITCHER CO.
Findlay, Ohio

For over 50 years Buckeye Trenchers have provided trenching with maximum overall economy

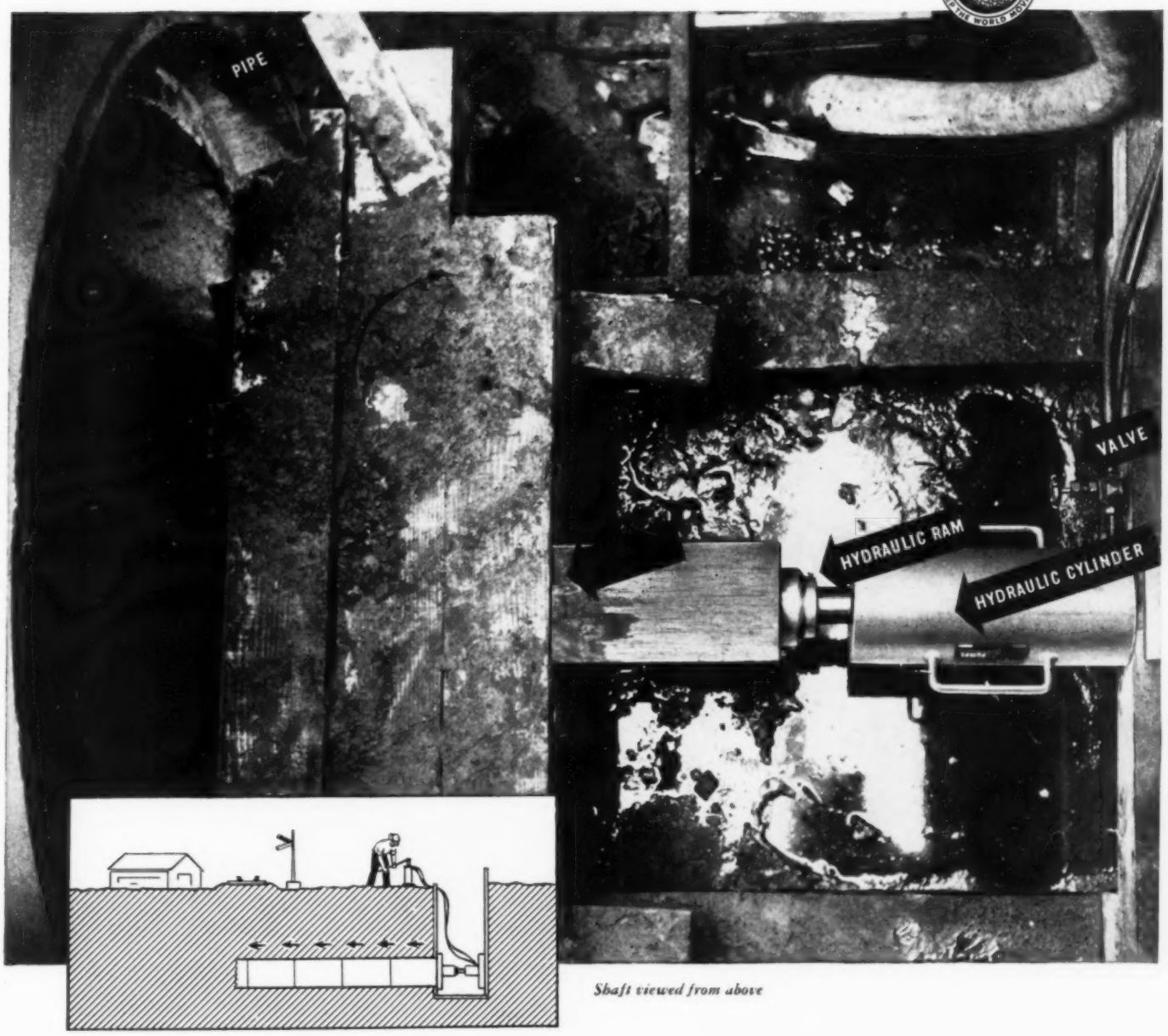
Over a dozen models—ladder and digging wheel types—in the broad soundly engineered Buckeye line. Service trenchers for general application, specialized models for airport and farm drainage, pipeline and utility work. When you think of trenching, you naturally think of Buckeye.

Built by Buckeye

Convertible Shovels Road Wideners Trenchers
Spreaders R-B Power Finegraders Tractor Equipment

NO. 21 OF A "READY-WITH-A-RODGERS" SERIES

HYDRAULICS Rodgers KEEP THE WORLD MOVING



Shaft viewed from above

"DRIVING PIPE FOR THIS STORM SEWER WAS DUCK SOUP WITH OUR RODGERS UNIVERSAL"

"We had to go under a freight house and railroad tracks, pushing 6-foot concrete tile through sand for 40 feet. But our Rodgers Universal Press handled it slick as a whistle . . . at 1/10 of what it would have cost without your equipment.

"Headed by a steel bonnet, the tile was inched through without a hitch. And it was a big help to pump that 150-ton pressure from the surface, instead of a cramped space 16 feet underground."

This was reported by a Wisconsin municipality. The all-purpose Rodgers Universal Press saved them both time and money. It can do the same for you. For complete information and prices, write or wire Rodgers Hydraulic, Inc., Dept. D-11, St. Louis Park, Minneapolis 16, Minnesota.

If it's a Rodgers it's the Best in Hydraulics

Uses for the RODGERS UNIVERSAL HYDRAULIC PRESS
Gear Pulling • Wheel Press Work • Jacking Pipe • Erecting Machinery • Relocating Machinery • All-Purpose Jack

RODGERS HYDRAULIC, Inc.

Smoothing the way for post-war traffic

Section of the worn granite block pavement on Ridge Avenue, Philadelphia, which is partly covered by a Texaco Asphalt binder course.

Texaco Sheet Asphalt wearing surface being laid on half the thoroughfare at a time by the Union Paving Company.

Traffic uses completed half of Texaco Asphalt pavement, while the other half is under construction.

The new, heavy-duty Texaco Sheet Asphalt pavement which now serves Ridge Avenue traffic.

Ridge Avenue, one of Philadelphia's busiest thoroughfares, serves the heavy traffic flowing into this city from the northwest. Because of the worn, rough condition of the old granite block pavement on Ridge Avenue, its improvement had become one of the city's most pressing paving problems.

Philadelphia solved this problem by using the well-consolidated granite block street as base for a resilient, heavy-duty Texaco Sheet Asphalt pavement. An asphalt binder course was laid over the old, uneven blocks to provide a level surface on which to construct a dense, durable Sheet Asphalt wearing course.

Traffic continued to use Ridge Avenue while half the new Texaco Asphalt pavement was being laid at a time.

Philadelphia is well acquainted with the rugged durability and low upkeep cost of Texaco Asphalt paving. More than 1,000,000 square yards of its streets have been Texaco-paved.

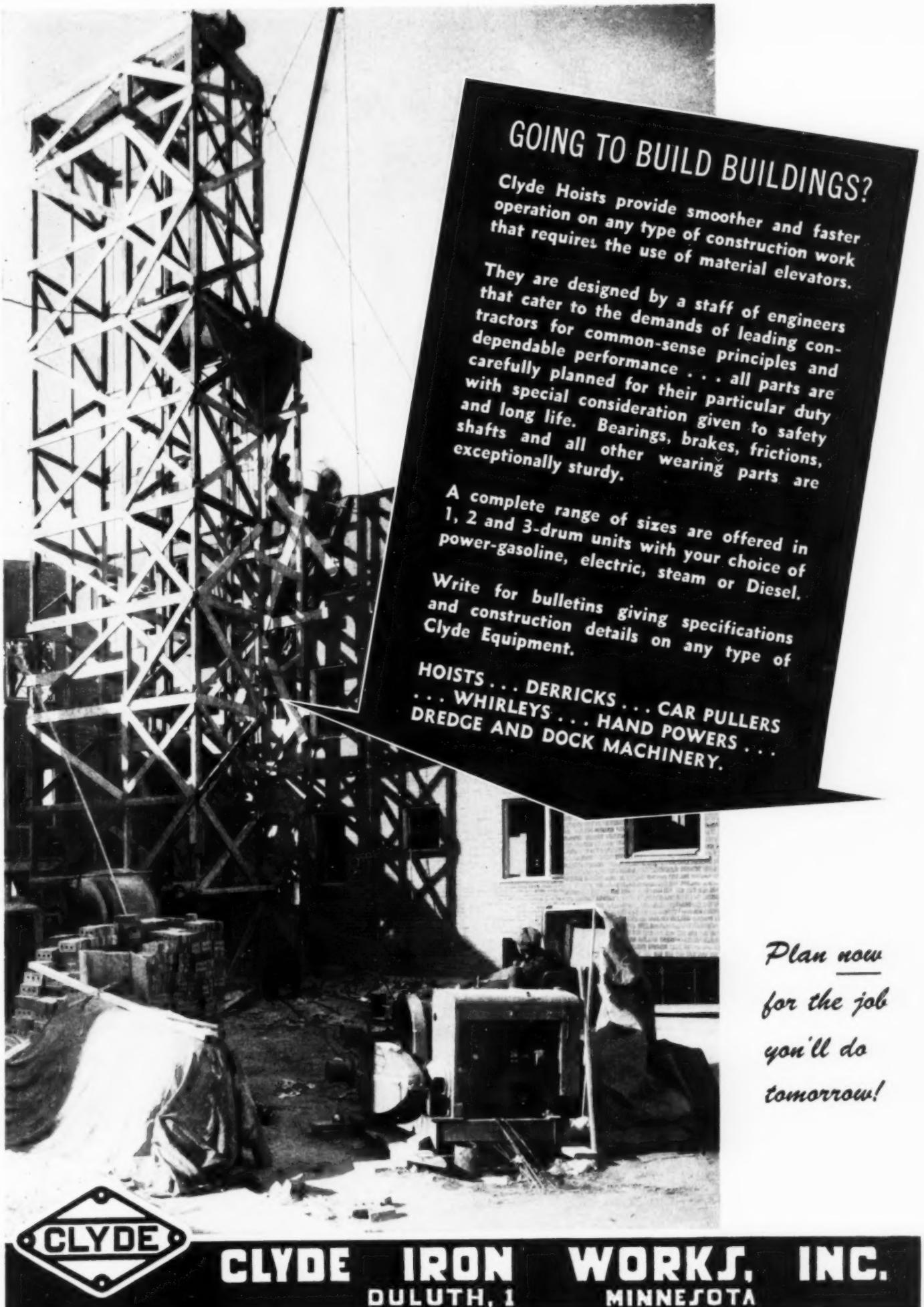
Texaco Engineers, specialists in Asphalt construction and maintenance, are at the service of anyone having a street, highway or airport paving problem. Get in touch with our nearest office.

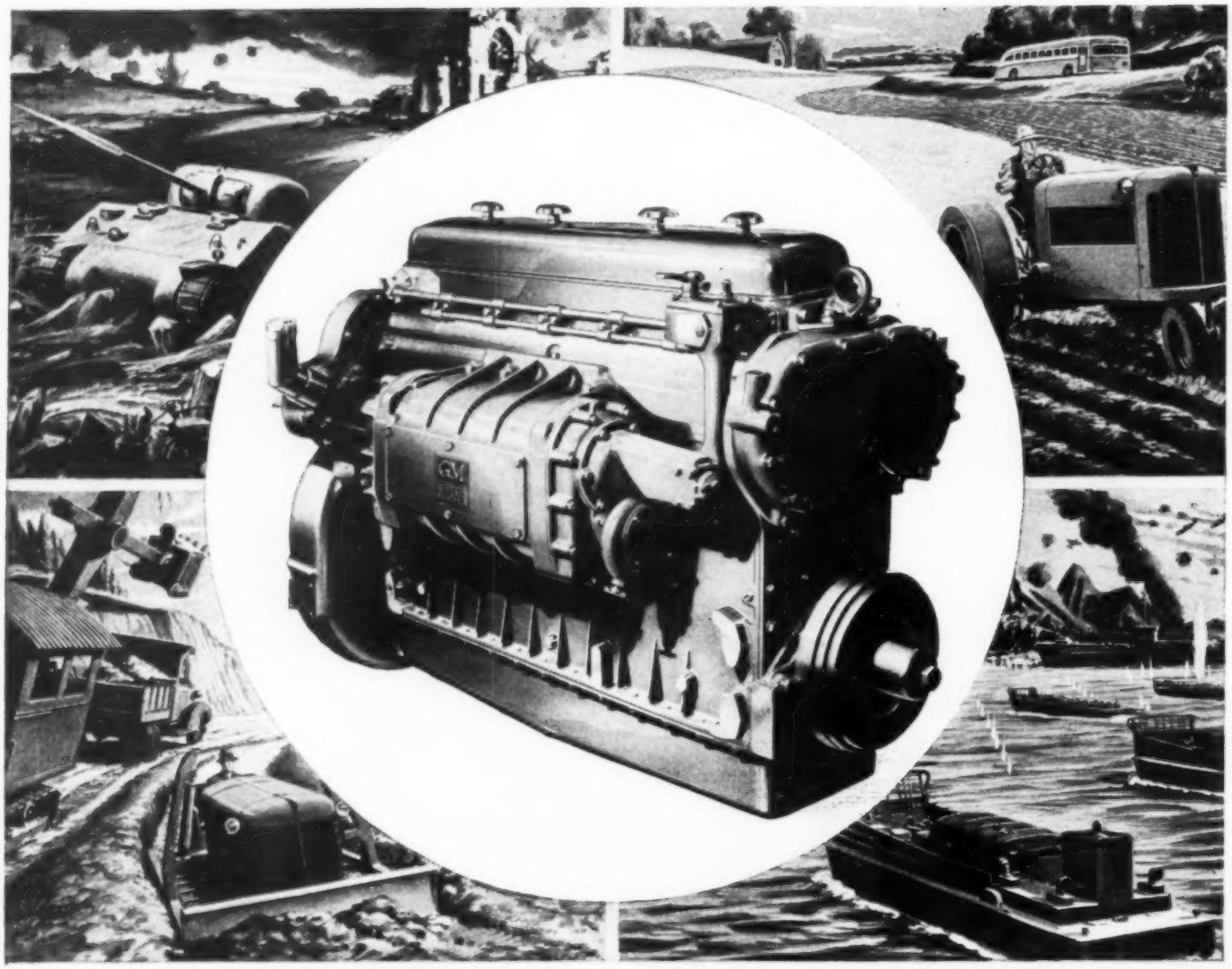
THE TEXAS COMPANY, Asphalt Sales Dept., 135 E. 42nd St., New York City 17

Boston 16 Chicago 4 Denver 1 Houston 1 Jacksonville 2 Philadelphia 2 Richmond 19

TEXACO

TEXACO ASPHALT


GOING TO BUILD BUILDINGS?
Clyde Hoists provide smoother and faster operation on any type of construction work that requires the use of material elevators.
They are designed by a staff of engineers that cater to the demands of leading contractors for common-sense principles and dependable performance . . . all parts are carefully planned for their particular duty with special consideration given to safety and long life. Bearings, brakes, frictions, shafts and all other wearing parts are exceptionally sturdy.
A complete range of sizes are offered in 1, 2 and 3-drum units with your choice of power-gasoline, electric, steam or Diesel.
Write for bulletins giving specifications and construction details on any type of Clyde Equipment.
HOISTS . . . DERRICKS . . . CAR PULLERS . . . WHIRLEYS . . . HAND POWERS . . . DREDGE AND DOCK MACHINERY.
Plan now for the job you'll do tomorrow!
CLYDE
CLYDE IRON WORKS, INC.
DULUTH, 1 MINNESOTA



GM DIESELS SERVE WHEREVER AMERICA NEEDS POWER

America's fighting Engineers and Seabees really work miracles. Sand dunes are leveled. Jungles are cleared. Landing strips appear overnight. Staggering loads are moved over land and sea.

Helping them work these miracles are General Motors Diesel engines.

Because these engines are rugged and dependable, they get the toughest kinds of jobs to do.

Because they take so little fuel, they save precious transport space.

Because they have been designed for simplest maintenance, they stay on the job and keep on the go.

War is a tough proving ground for engines. It shows their mettle, reveals their stamina. As they perform their wartime tasks, these GM Diesels are proving the service they will continue to render in the many civilian needs for dependable, economical power after the war.

The Army-Navy "E" for efficiency in war production flies proudly over the GM Diesel plant in Detroit.

KEEP AMERICA STRONG
BUY WAR BONDS

GM
GENERAL MOTORS
DIESEL POWER

ENGINES . . 15 to 250 H. P. . . **DETROIT DIESEL ENGINE DIVISION,** Detroit 23, Mich.

ENGINES . . 150 to 2000 H. P. . . CLEVELAND DIESEL ENGINE DIVISION, Cleveland 11, Ohio

LOCOMOTIVES . . . . . ELECTRO-MOTIVE DIVISION, La Grange, Ill.

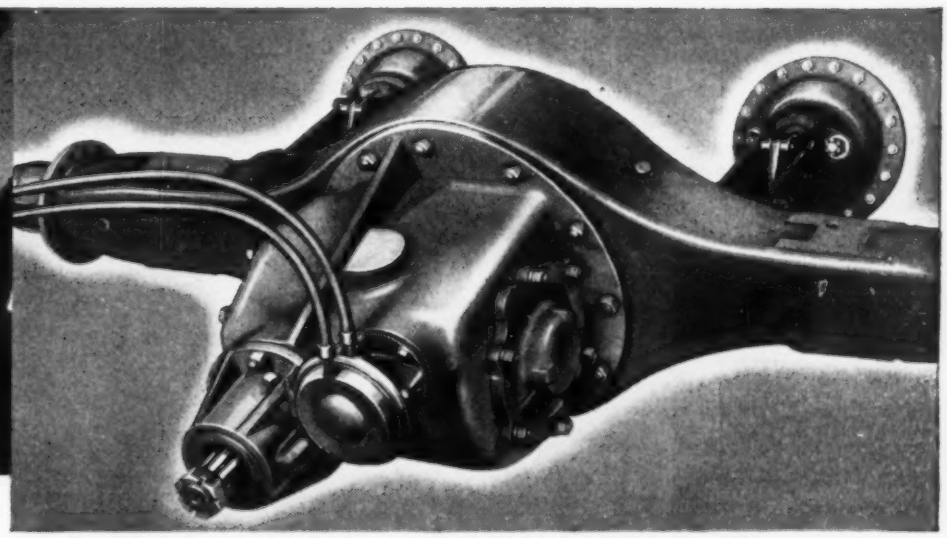
More power ★ Faster schedules ★ Increased truck earnings ★ Easier driving with

TIMKEN

EASY POWER SHIFT

and Timken 2-speed double reduction axles

Dash selector permits pre-selection of fast or slow axle ratio. Axle gears are power-shifted when accelerator is released momentarily.



Vacuum power chamber built into the axle furnishes power for shifting axle gears. All working parts are enclosed.

Capacity loads, fast schedules, more trips per day, longer hours on the road, are essential to meet today's highway transport demands. Only trucks geared for both power and speed can hope to meet these demands successfully.

Timken's new Easy POWER Shift, available only with new Timken 2-Speed Double Reduction Axles, provide the ideal combination of power and speed for modern heavy duty highway transport.

Easy POWER Shifting enables the driver to change axle ratios instantly, under any driving conditions, merely by using the Dash Selector and releasing the foot throttle momentarily. Declutching is not necessary. Combined axle and transmission shifts, or gear splits, can be made as easily and in the same time as transmission shifts alone.

By doubling the number of transmission ratios, with any gear combination instantly available, Easy POWER Shifting greatly increases truck performance—provides more pulling power, speeds up schedules, reduces operating and maintenance costs, increases earnings per ton-mile, and reduces driver fatigue.

Write for descriptive folder.

38 YEARS OF AXLE ENGINEERING LEADERSHIP

TIMKEN AXLES — Timken-Detroit — D A CO

TIMKEN AXLES

THE TIMKEN-DETROIT AXLE COMPANY, DETROIT 32, MICHIGAN

WISCONSIN AXLE DIVISION • OSHKOSH, WISCONSIN

WHAT IS MACHINERY'S No. 1 ESSENTIAL?

. . IT'S LUBRICATION OF THE RIGHT KIND that will keep production machines in good operating condition and continuously on the job. Idle machines due to worn bearings, gears or chains, caused by improper lubrications are certainly on the blacklist these days . . . and remember that machine replacement parts are most difficult to get. Yes—the No. 1 essential today is proper lubrication.

★ ★

7 QUICK FACTS ABOUT LUBRIPLATE LUBRICANTS

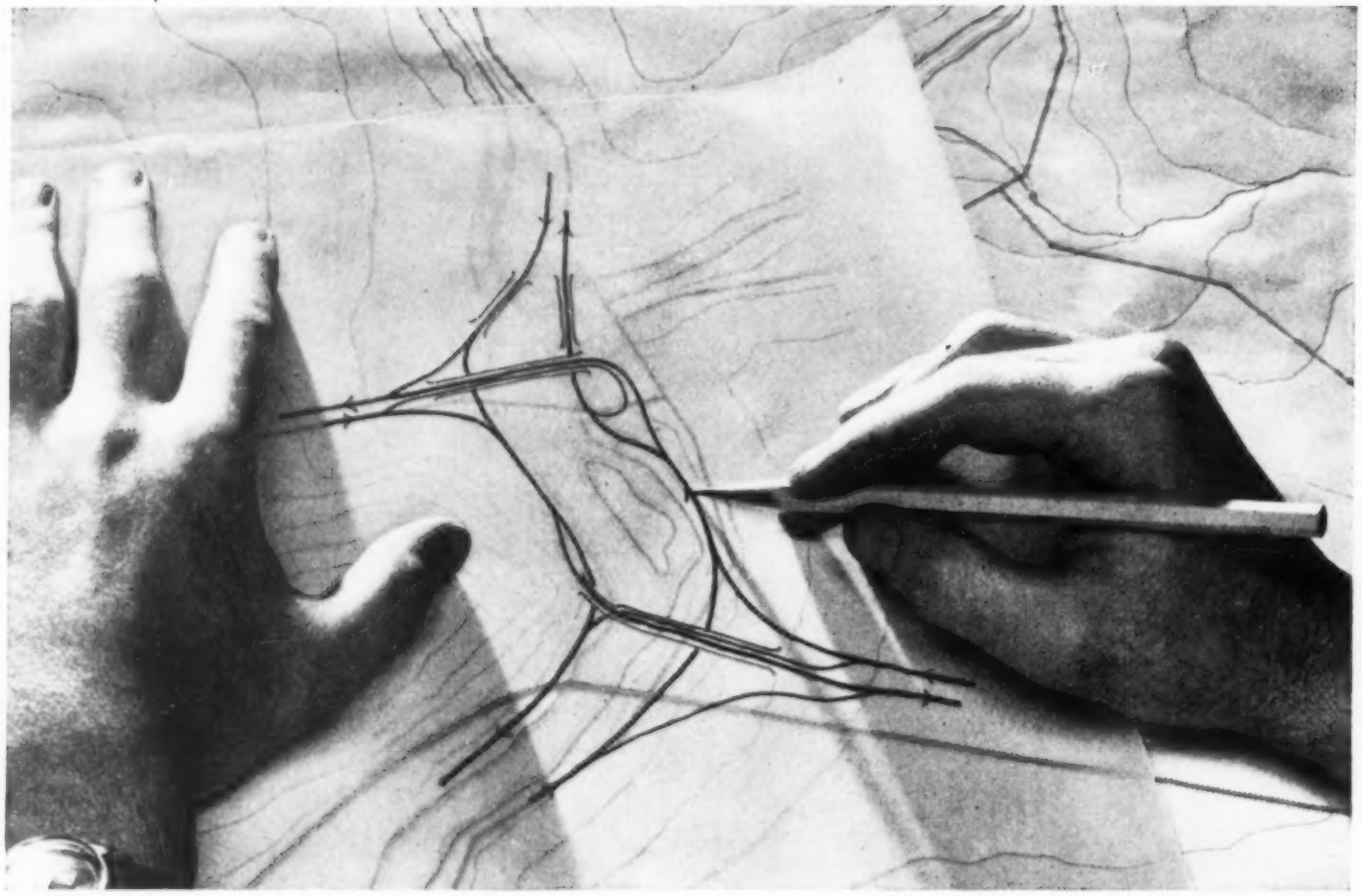
1. *LUBRIPLATE produces an ultra-smooth, wear-resisting bearing surface.*
2. *LUBRIPLATE reduces friction, thus lowering maintenance and power costs.*
3. *LUBRIPLATE resists rust, corrosion and pitting.*
4. *Most LUBRIPLATE products are white. LUBRIPLATE assures clean lubrication.*
5. *LUBRIPLATE outlasts ordinary lubricants many times.*
6. *LUBRIPLATE is economical—a little goes a long way.*
7. *LUBRIPLATE is available in fluid and grease types for every need.*

LUBRIPLATE DIVISION
FISKE BROTHERS REFINING COMPANY
SINCE 1870
Newark, N. J. Toledo, Ohio
DEALERS FROM COAST TO COAST

LUBRIPLATE

"Its the Film"

THE MODERN LUBRICANT *that Arrests Progressive wear*



Planning tomorrow's highways . . . today

America's highways have served the nation well, but taken plenty of punishment in this war. Many of them will need heavy repairs when it's over. Some will be completely rebuilt, even relocated.

What is it going to cost to put our highway system in shape to take care of post-war traffic? Long-term projects to cost $7,000,000,000 have already been definitely proposed by State officials.

In the view of some authorities, expenditures could well run as high as $1,630,000,000 a year—nearly three times as much as in 1940, the previous peak year. The American Road Builders' Association favors an even larger program—$3,000,000,000 a year for postwar highway construction (including new bridges to be built and existing ones to be widened).

The magnitude of the job stirs the imagination. Doesn't it set you to thinking about the mountains of earth to be moved, the tons of concrete to be poured and steel to be set in place, the battalions of men to be put to work at useful, lasting projects?

It's a vast undertaking that faces the nation's highway engineers and contractors. In making plans for shouldering your share of it, give some thought to the time-saving, money-saving service which Bethlehem offers. When construction gets under way, you can quickly fill all your road-steel needs through a Bethlehem warehouse near you. Thus you'll avoid confusion, extra work, delays and duplication.

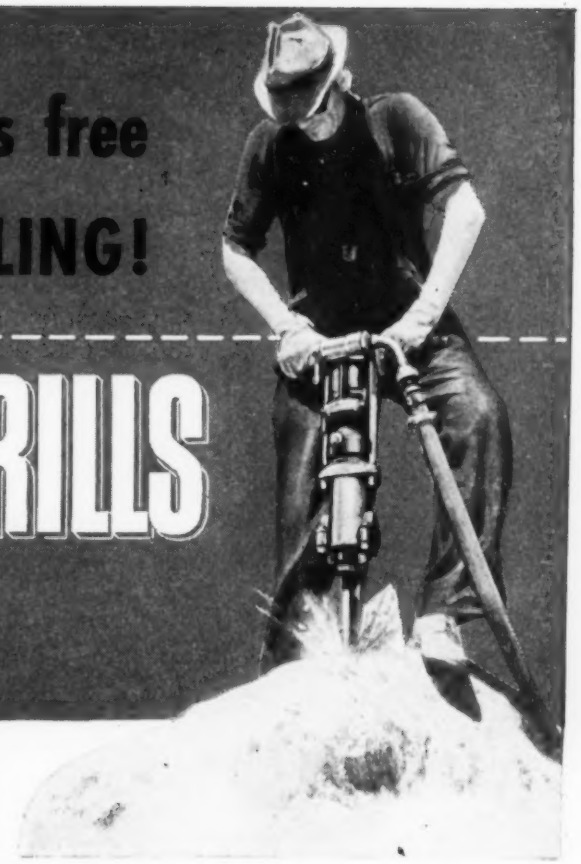
Bethlehem Road Products

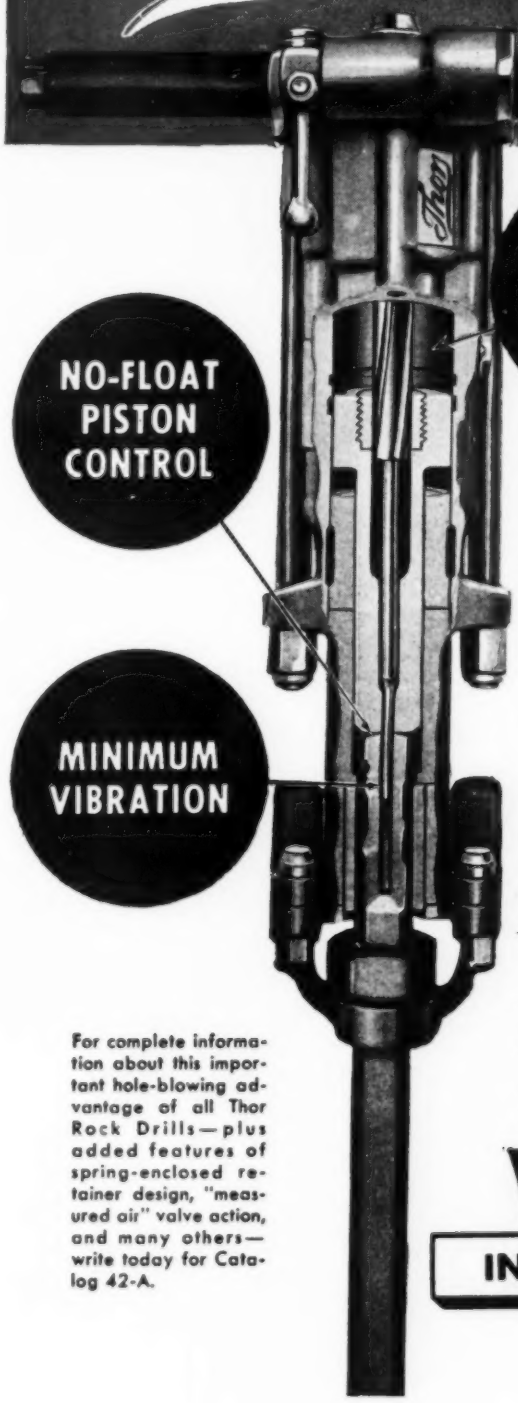
REINFORCING BARS AND BAR MATS • DOWELS • STEEL H AND Z PILING DOWEL BAR SUPPORTS • TURNBUCKLES • HIGHWAY GUARD RAILS • CABLE HIGHWAY GUARD • STEEL HIGHWAY POSTS • ROAD JOINTS • GUARD RAIL ANCHOR RODS • CABLE BRACKETS • STEEL SHEET PILING • BAR TIES WIRE ROPE AND STRAND

★ ★ ★ BETHLEHEM STEEL ★ ★ ★

They BLOW all cuttings free for FASTER, SURER DRILLING!

Thor ROCK DRILLS





Full-Pressure Air Blast Straight Through the Tool Assures Positive Hole-Cleaning

There's no accumulation of cuttings at the drilling point to cut down speed or stall the drill by jamming the steel when Thor Rock Drills let go with their *full-line* blast of air to keep the hole clean . . . to keep the drilling rate fast and steady!

Powerful hole-blowing is an important advantage of all Thor Rock Drills which not only steps up drilling speed for more footage per shift, but also slashes maintenance costs by extending the life of both the tools and the drill steels through minimum vibration.

HERE'S WHY CUTTINGS WILL NOT STALL THOR ROCK DRILLS!

Full-Line Pressure—Exclusive Thor design places exhaust ports to remove all air from *below* the piston when the operator blows the hole. Full-line air pressure is concentrated behind the piston to force it down tight against the steel—directing full air power straight through the machine and into the hole.

No-Float Piston Control—Forcing the piston tight against the steel prevents floating and fluttering inside the cylinder during the blowing operation. No air is wasted. Hole-blowing is extra-efficient and powerful.

Minimum Vibration—The air tube inside the piston and hammer is *held rigid* by tight joining of the piston and steel to assure longer service life by reduction of vibration.

For complete information about this important hole-blowing advantage of all Thor Rock Drills—plus added features of spring-enclosed retainer design, "measured air" valve action, and many others—write today for Catalog 42-A.

Thor *Portable Pneumatic and Electric Tools*

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. JACKSON BOULEVARD, CHICAGO 6, ILL.

Branches in Principal Cities

22° BELOW ZERO

98° ABOVE

THE SEAMAN MIXER *Does the Impossible* IN AIRFIELD CONSTRUCTION

Above: Entire runway area consisted of large, solidly frozen marsh bogs.

Below: The finished runway after three days and nights of work with the SEAMAN.

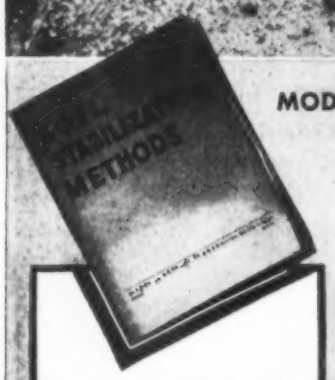
An intermediate runway had to be constructed at once to qualify an airfield (Waukesha, Wis.) for a Federal Pilot Training program. The contract would start in February. It was then the middle of January; — temperature 22° below zero and no relief in sight. The runway had to be built through a marsh literally peppered with bogs 12 to 18 inches in height — and the ground frozen so hard a pick axe would not penetrate.

Ten days were left when Seaman Motors was called into consultation. Hastily a new rotor for the SEAMAN PULVI-MIXER was designed, — modified of course for this extraordinary condition — and the machine put to work immediately, grinding and milling the rough, frozen ground to required level. Three days and three nights of cold, numbing work with the SEAMAN, — but on the morning of the fourth day, pilots landed their ships on the new runway . . . the only time in the history of flying a runway was constructed under such conditions.

Below: In hot, baking 98° weather the SEAMAN MIXER pulverized sod to effect a runway leveling operation.

98° ABOVE

A turf airfield had developed rough, jolting declivities and sharp ridges. Conventional tillage to break up the sod failed to reduce the clods sufficiently to prevent a lumpy surface after reseeding. Heavy rains had led to severe soil compaction and hot, dry weather following had baked the area as hard as a pavement. Again a call to Seaman Motors. The SEAMAN PULVI-MIXER in two passes completely pulverized the soil and at the same time filled in the low spots. In a few hours the area was finished and ready for seeding.



Yours for the asking, — the new 1944 Edition of "Soil Stabilization Methods" compiled by Seaman engineers. Ask for Bulletin C-24.

MODEL MHD-72

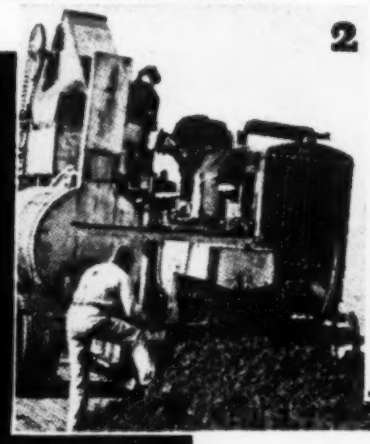
"Every Soil Stabilization Job needs a Seaman!"

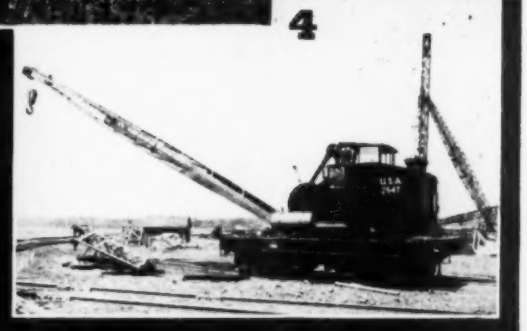
SEAMAN MOTORS
MILWAUKEE, WISCONSIN

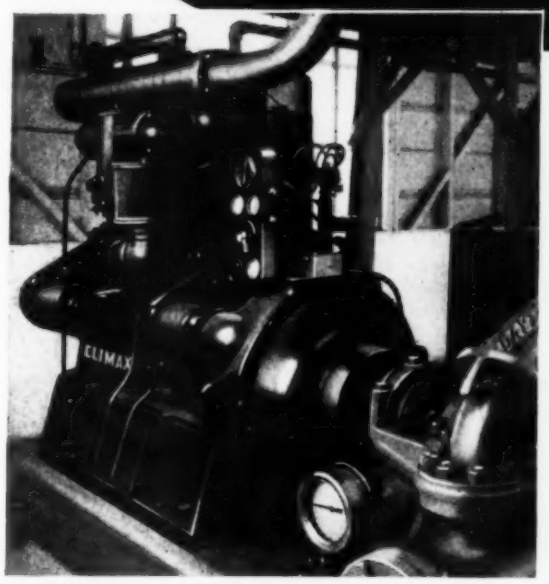
LET Climax SUPPLY THE POWER

for

WHATEVER CONSTRUCTION EQUIPMENT YOU WILL BUILD OR OPERATE







SEND FOR Climax engine bulletins which give full information—specifications, performance curves, outline dimensions and complete description. Address your letter to Climax Engineering Company, 1807 South Fourth St., Clinton, Iowa.

IT WILL PAY YOU TO USE **Climax** *Blue Streak* GAS ENGINES

1 Standby power for the fire protection reservoir and pumping station in an aircraft plant is furnished by this Climax Model N4B engine.

2 This Cedarapids "Roadmix" made by Iowa Mfg. Co. and powered by a Climax Model R6I, is but one of the numberless profitable applications for this versatile power plant.

3 Fast agile horsepower is obtained from this 35-42 Ton Industrial Brownhoist Locomotive Crane, built for the U. S. Army.

4 For dependable power in small space this Industrial Brownhoist is equipped with a Climax R6I (166 h. p.) engine.

IF YOU HAVE A Climax engine on your equipment, you'll never have to worry about the power. These Blue Streak engines possess every modern refinement that technical ability and experience indicate as desirable.

The simple, well-balanced design promotes high operating efficiency and dependability. *The low piston speeds and moderate compression* ratios insure nominal maintenance and long life. *Blue Streak Combustion,* an exclusive Climax feature, gives unusually high horsepower output on little fuel. The special shape of the combustion chamber, and placement of valves and spark plugs reduce detonation when engine is overloaded, improve gas mixing and scavenging. *Deep and wide water passages* provide ample cooling and maintain low, safe running temperatures.

Other features which contribute to peak performance include: fast electric starting; dual ignition and dual carburetion; governors for close speed regulation, and complete accessory equipment which permits the engine to be "tailored" to the most exacting requirements of a specific load.

Climax Engineering Company
GENERAL OFFICES AND FACTORY: CLINTON, IOWA
REGIONAL OFFICES: CHICAGO, ILLINOIS • DALLAS, TEXAS

Affiliated Companies: McAlear Mfg. Co., Chicago • Hanlon-Waters Co., Tulsa

A scientific development that costs you no more

IT'S THE *internal lubrication* IN MACWHYTE PREformed WIRE ROPE

In Macwhyte PREformed Wire Rope, Internal Lubrication increases the life of the rope, thereby reducing operating costs.

A special-formula lubricant made to Macwhyte specifications is force-fed to the wires as they are being closed into the strand.

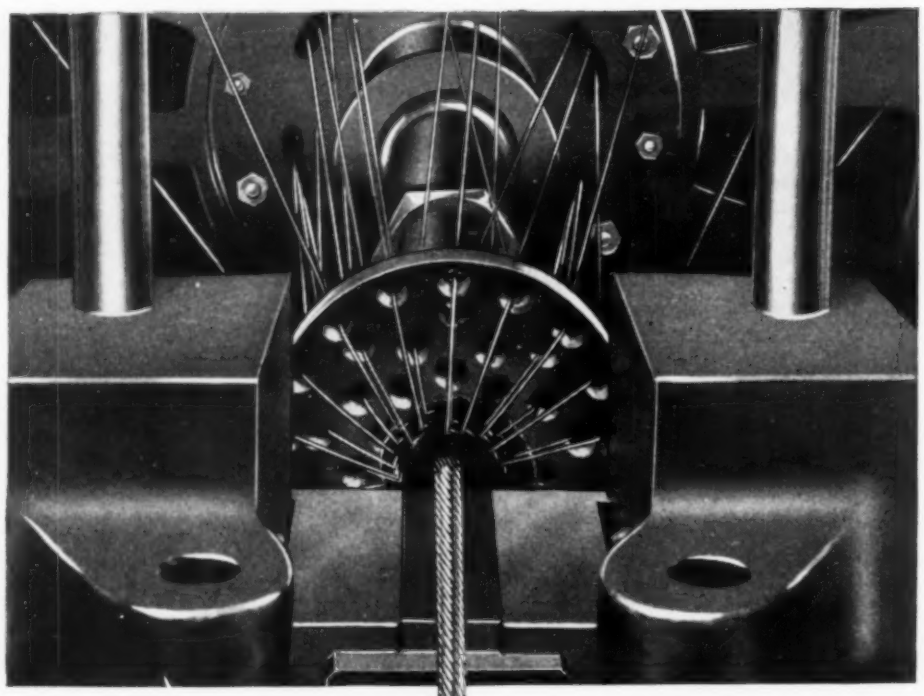
Macwhyte Internal Lubricant improves the sliding action of the wires as they move in bending around sheaves and drums. In many cases the inside wires are in good condition after the outside wires are seriously worn.

Operators of equipment prefer Macwhyte PREformed Wire Rope because it operates so smoothly and spools on the drum so well.

Macwhyte Wire Rope Lubricant is packed around each wire in all strands of Macwhyte Wire Rope.

If you have a service problem, Macwhyte Wire Rope engineers stand ready to give you the benefit of their experience in selecting the proper size, grade, and construction.

The demands of our armed services are so great now, there may be times when we cannot give you our usual prompt service and delivery. The situation changes from day to day so please keep trying to get Macwhyte Wire Rope. We'll serve you if we possibly can.



The above illustration shows how internal lubrication is applied to Macwhyte PREformed ropes. *(Top of stranding die is removed.)* Note the wires pass through the lubricant which is pumped up from below and therefore each wire is completely covered and all spaces between the wires in the strand completely filled.

Rope Conservation Bulletins

18 illustrated articles on the use and care of Wire Rope have been bound into an 8½" x 11" book which is available free to Wire Rope users requesting it on their company letterhead. Ask for Bulletins No. 43-85.

MACWHYTE PREformed WIRE ROPE *Plus* Internal Lubrication Selected Steels Tested-Proved

The correct rope for your equipment

NO. 758

MACWHYTE COMPANY

Wire Rope Manufacturers

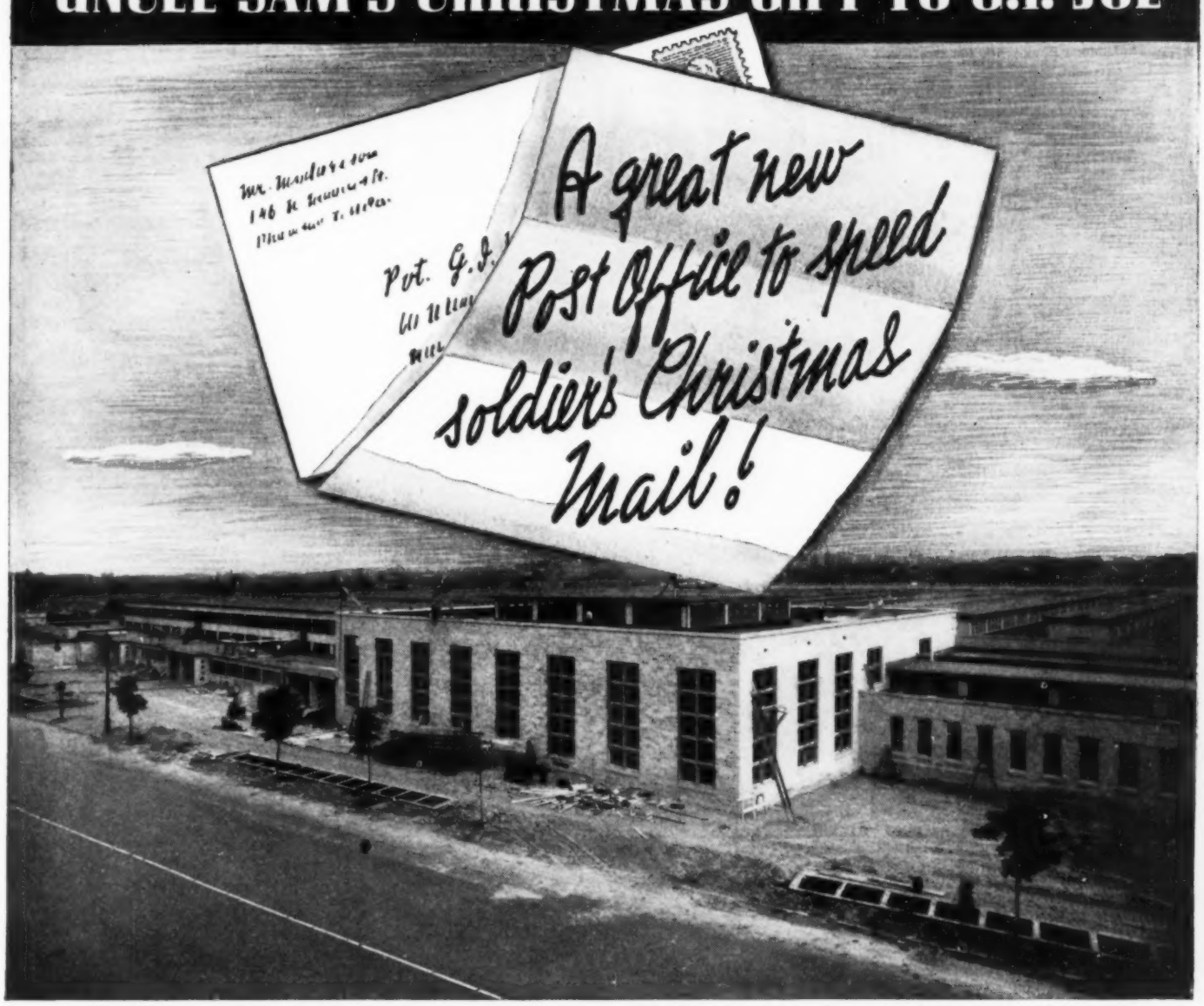
ARMY E NAVY

2941 FOURTEENTH AVENUE KENOSHA, WISCONSIN

Mill Depots: New York · Pittsburgh · Chicago · Fort Worth · Portland · Seattle · San Francisco. Distributors throughout the U.S.A.

MACWHYTE PREformed and Internally Lubricated Wire Rope · MONARCH WHYTE STRAND Wire Rope · MACWHYTE Special Traction Elevator Rope · MACWHYTE Braided Wire Rope Slings · MACWHYTE Aircraft Cables and Tie-Rods · MACWHYTE Stainless Steel Wire Rope · MACWHYTE Monel Metal Wire Rope

UNCLE SAM'S CHRISTMAS GIFT TO G.I. JOE



ARCHITECT: Alfred Hopkins & Associates, New York City, N. Y. CONTRACTORS: John A. Johnson, Contracting Corporation, Brooklyn, N. Y.

GOOD news to G. I. Joe and the folks back home—is this new overseas Army Post Office at Long Island City, N. Y. Called "A miracle of construction" by Col. Edgar W. Garbisch, District Engineer, New York District Office, U. S. Army Engineers, under whose supervision it was erected—this building, covering 14¼ acres, was completed in 90 days—10 days ahead of schedule—during the hottest summer on record. It is intended to speed Christmas and other mail to soldiers overseas.

We are proud that Lehigh contributed in a measure to its construction. Lehigh was used in the concrete work, the manufacture of the exterior masonry units, and the cinder partition blocks.

Lehigh makes 3 types of cement:

LEHIGH NORMAL CEMENT LEHIGH EARLY STRENGTH CEMENT
LEHIGH MORTAR CEMENT

Lehigh Early Strength Cement is the product that makes service strength concrete 3 to 5 times faster than normal cement. Ask for bulletin on concreting in cold weather with Lehigh Early Strength Cement.

Lehigh CEMENT

LEHIGH PORTLAND CEMENT COMPANY • ALLENTOWN, PA. • CHICAGO, ILL. • SPOKANE, WASH.

NOW SUPER-ARMORED WITH RAYOTWIST CORD

plus positive O-P-E-N C-E-N-T-E-R traction

International Diesel Tractor dual-equipped with Goodyear Sure-Grips; Mississippi Wagon Trailer on Goodyear All-Weather Earth-Movers.

LONG the first choice of contractors for off-the-road operations, these tough Sure-Grips have even greater job stamina today because they're now armor-built with Rayotwist cord—Goodyear's patented rayon cord—making *the strongest body ever used in a work tire!*

With Rayotwist-armored carcass, these Goodyears are by far the finest work tires that can be built from today's available materials—including the mandatory amount of synthetic rubber. They deliver more ton-miles of heavy-duty service.

And thanks to its O-P-E-N C-E-N-T-E-R *self-cleaning* tread, this tougher-than-ever tire has no dead-end pockets to trap mud and cause slippage. Its wide, unblocked channels sluice out dirt and stones, leaving those massive lugs free to bite deep and pull in any going.

This adds up to the longest-lasting, hardest-working tire available — a tire that delivers *more work at less cost!*

For proof of that, ask the men who are using Goodyears. When you do, chances are you'll soon be using them too.

THE RIGHT TIRE FOR EVERY JOB

HARD ROCK LUG for all rock work

ALL-WEATHER EARTH-MOVER for drawn dirt-movers

SURE-GRIP for traction in soft going

Rayotwist, Sure-Grip, All-Weather—T.M.'s The Goodyear Tire & Rubber Company

BUY WAR BONDS — BUY FOR KEEPS

GOODYEAR

THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Construction Methods

ROBERT K. TOMLIN, Editor

Volume 26 — NOVEMBER, 1944 — Number 11

STAMPLICKER in form of truck-hauled trailer equipped with rollers applies asphalt-impregnated burlap, or "hessian" to advanced fighter airfields in invasion areas of France.

Signal Corps Photo

"Stamplicker" LAYS AIRFIELD SURFACING

NINTH AIR FORCE AVIATION ENGINEERS in France are using for advanced fighter fields a new type of surfacing generally known as PBS (prefabricated bituminous surfacing) or "hessian." It consists of a strip of burlap 40 in. wide impregnated with asphalt to a thickness of approximately 1/16 in. The material comes in 75- to 100-yd. rolls which vary in weight from 300 to 400 lb. The variation in dimensions and weight is due to the fact that different firms are engaged in the manufacture of the material. The average hessian will run about 3.5 to 4.0 lb. per sq. yd.

The accompanying photograph shows the "stamplicker" used in placing hessian. The truck—which pulls the stamplicker at 2½ to 4 mph—carries rolls of hessian that are fed through a series of rollers as illustrated. Rolls of hessian are shown standing upright in the truck. The large roller at the top of the stamplicker is the one from which the machine takes its name. It turns through a reservoir of solvent—composed of a 50-50 solution of gasoline and RC-3 cutback asphalt—softening the underside of the hessian and causing it to stick to the adjacent strip of the material. The PBS is laid with a 50 per cent overlap, thus giving a double thickness of material over the entire landing strip. The dark line at the center of the hessian (see photograph) is used as a guide in overlapping succeeding strips. The white color of the PBS in the photograph is due to the powder used to prevent the material from sticking when rolled.

Seams along adjoining strips are sealed with RC-3 if a non-skid surface is not to be applied. If a non-skid surface is desired the mat is sprayed with RC-3 at 120 deg. F. which cuts back the surface of the PBS but does not expose the fabric. Sand is then spread—approximately 3 lb. per sq. yd.—and is imbedded in the surface of the mat by wobble wheel (pneumatic-tired) rollers. Excess sand is brushed off with a rotary sweeper. With completion of this operation, the runway is ready for traffic.

As is true for other types of wearing surfaces for runways, the success of a hessian-covered landing strip depends upon a good subbase. The hessian provides a waterproof, non-skid surface and solves the dust problem. Service records, so far, indicate excellent results. Tests made on the hessian mat in this country prove it to be entirely satisfactory for surfacing of advance fighter fields. It is not used for medium or heavy bombers. These must rely upon steel or aluminum pierced plank as surfacing for advance fields.

TVA'S FONTANA DAM is viewed by GOVERNOR J. MELVILLE BROUGHTON (right) of North Carolina. With him is FRED C. SCHLEMMER, project manager in charge of building dam on Little Tennessee River. Dam will be 460 ft. high and will store 4,570,000 acre-ft. of water. Fontana's aggregate plant is described in this issue.

Wide World Photo

FIRST BIRTHDAY is celebrated by Alaska Highway. One year old in mid-October, it will remain military road until close of war. Then, according to War Department, it can be readily adapted to peacetime travel if traffic volume justifies installation of filling stations, tourist camps and other conveniences.

DIVERSION of MOTOR-VEHICLE REVENUES to non-highway purposes is prohibited in Maine by constitutional amendment adopted Sept. 11. Speakers (left) at statewide meeting held just before election to promote amendment were (left to right): CONGRESSMAN JENNINGS RANDOLPH of West Virginia, U. S. House Roads Committee member; W. S. ANDERSON, president, Maine Good Roads Association; and CHARLES M. UPHAM, engineer-director, American Road Builders Association.

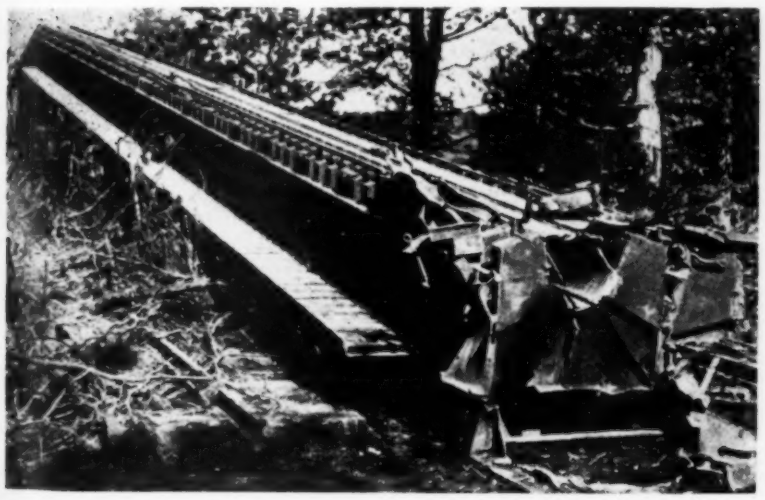
THIS MONTH'S NEWS REEL

Page 52

NATIVE INDIAN WOMEN (below) widen Ledo Road from India to Burma. They carry earth away from side of hill in baskets. Many carry babies in their arms while working. Signal Corps Photo

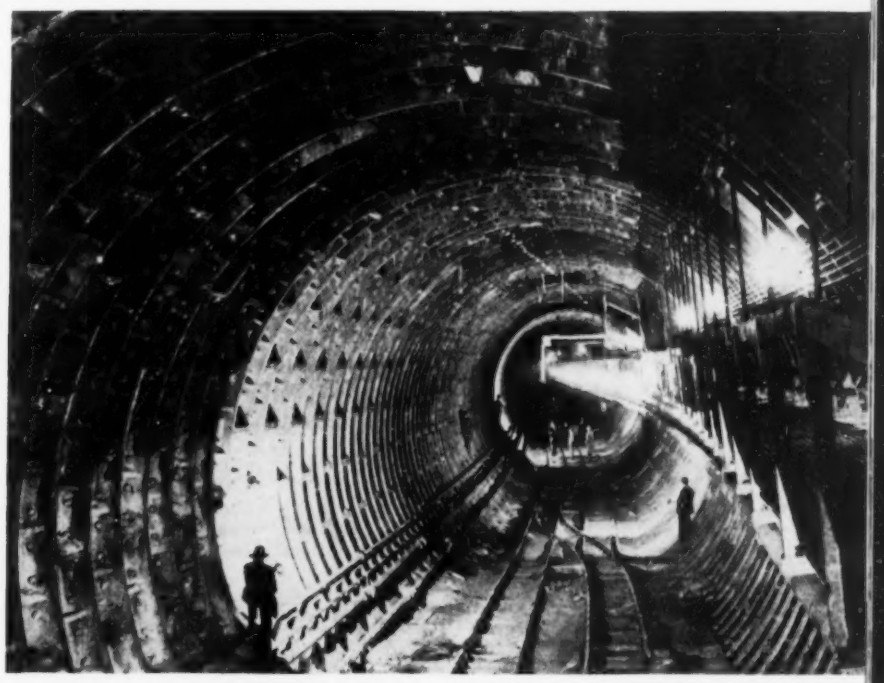
SIEGFRIED LINE BARRICADE (below) inside Germany is penetrated by Yanks. Here jeep carrying machine gun drives through gap cut in reinforced concrete "dragon's teeth" anti-tank barrier near Aachen. Press Association Photo

ALMOST READY for pouring 440,000 cu. yd. of concrete is left bank of Ross damsite across Skagit River canyon in northwestern Washington. Contractor for project, which will raise structure 185 ft. in height and lengthen it 610 ft., is General-Shea-Morrison, under direct supervision of City of Seattle Department of Lighting, of which E. R. Hoffman is superintendent. Features illustrated are: (A) abutment excavation for future extension; (B) 185-ft. addition to existing dam; (C) catwalk to control house; (D) concrete mixing plant; (E) aggregate conveyor; (F) intake to 24½-ft.-dia. power tunnels; (G) head tower.



FLYING BOMB SITE at Belloy-sur-Somme, near Amiens, France, is taken by British. Runway was damaged by Germans in attempt to destroy launching ramp before leaving.

British Combine Photo



LAKE FORMS behind newly closed Kentucky Dam (below) as construction work atop structure continues. Built within huge cellular cofferdams near mouth of Tennessee River, this TVA dam is 160 ft. high above bedrock and has total length of 8,650 ft. Construction required excavation of nearly 700,000 cu. yd. of rock and more than 6,000,000 cu. yd. of earth.

TO RESUME WORK on Brooklyn-Battery Tunnel, Mayor LaGuardia and New York City Tunnel Authority have applied to WPB for approval of manufacture of 790 tons of bolts, washers and nuts needed for cast-iron segments forming lining rings. This partially finished section has already been bolted. Authority believes tunnel can be ready for operation 3 yr. after resumption of work.

Wide World Photo

High-Capacity Fontana Plant

Produces Large Daily Output for 2,800,000-Yd. Concrete Dam

By R. T. COLBURN, Construction Plant Engineer,

Tennessee Valley Authority, Knoxville, Tenn.

IN TWO PARTS . . . Part I

FONTANA DAM, the highest and the largest dam east of the Rockies, is nearing completion. This dam, a concrete gravity structure being built by the Tennessee Valley Authority for power development and flood storage on the Little Tennessee River in North Carolina, will tower 460 ft. above its river bed and will measure 2,300 ft. along its crest.

Need for additional power in the war emergency dictated a fast construction schedule which was one of the principal factors in planning the construction plant and selecting the equipment. To meet this fast schedule, a total of 2,800,000 cu. yd. of concrete is being placed in 20 months from the time the first bucket was discharged at Fontana on Feb. 26, 1943.

The year previous to the beginning of concrete operations called for concentrated work in excavating river bed and abutments, driving two 34-ft. finished-diameter diversion tunnels, constructing cofferdams, stripping a quarry, and building the construction plant and a temporary camp. Plant planning was more than ordinarily difficult because of re-

FOR FAST PLACEMENT of concrete in 2,800,000-cu. yd. dam at scheduled rate of 8,000 cu. yd. per day, constructors utilize hammerhead and revolving cranes on steel trestles. Upper trestle, about 430 ft. above riverbed, contains deck steel previously used on similar trestle at 200-ft. lower elevation. Diesel locomotives on trestles shuttle flat-cars carrying 4-cu. yd. buckets between concrete hoppers and cranes. Belt conveyors deliver concrete to hoppers from mixing plant, top of which may be seen in lower foreground. Outlet of one diversion tunnel is visible on far side of river.

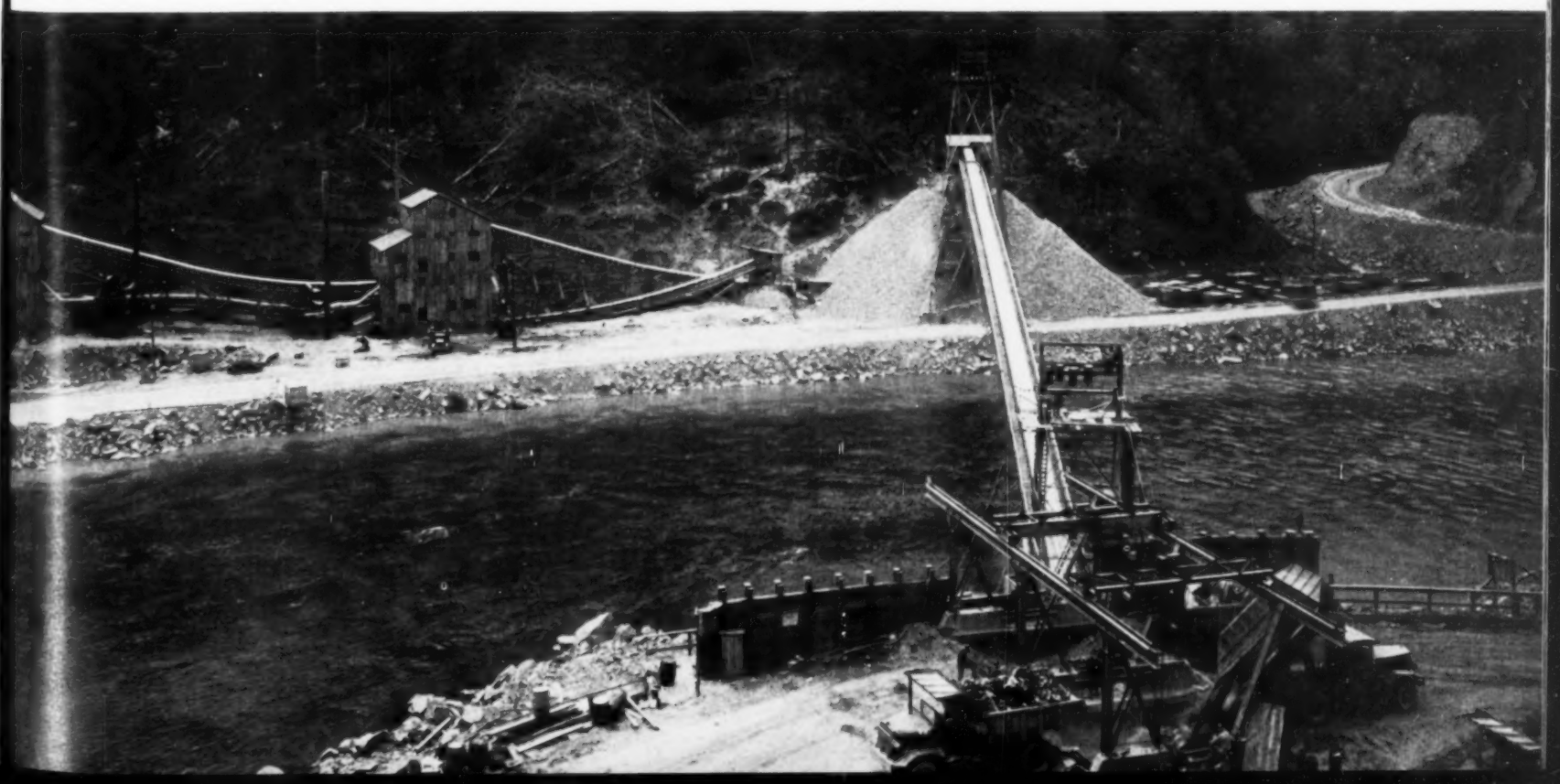
AGGREGATE PROCESSING PLANT stretching along river bank includes: (A) primary stockpile, (B) crusher building No. 1, (C) crusher building No. 2, (D) surge bins for rod mills, (E) sand plant made up of rod mills, hydro-separator and classifiers, (F) sand conveyor, (G) rock conveyor, (H) sizing screens and stackers over storage piles, and (I) suspension conveyor bridge from storage piles.

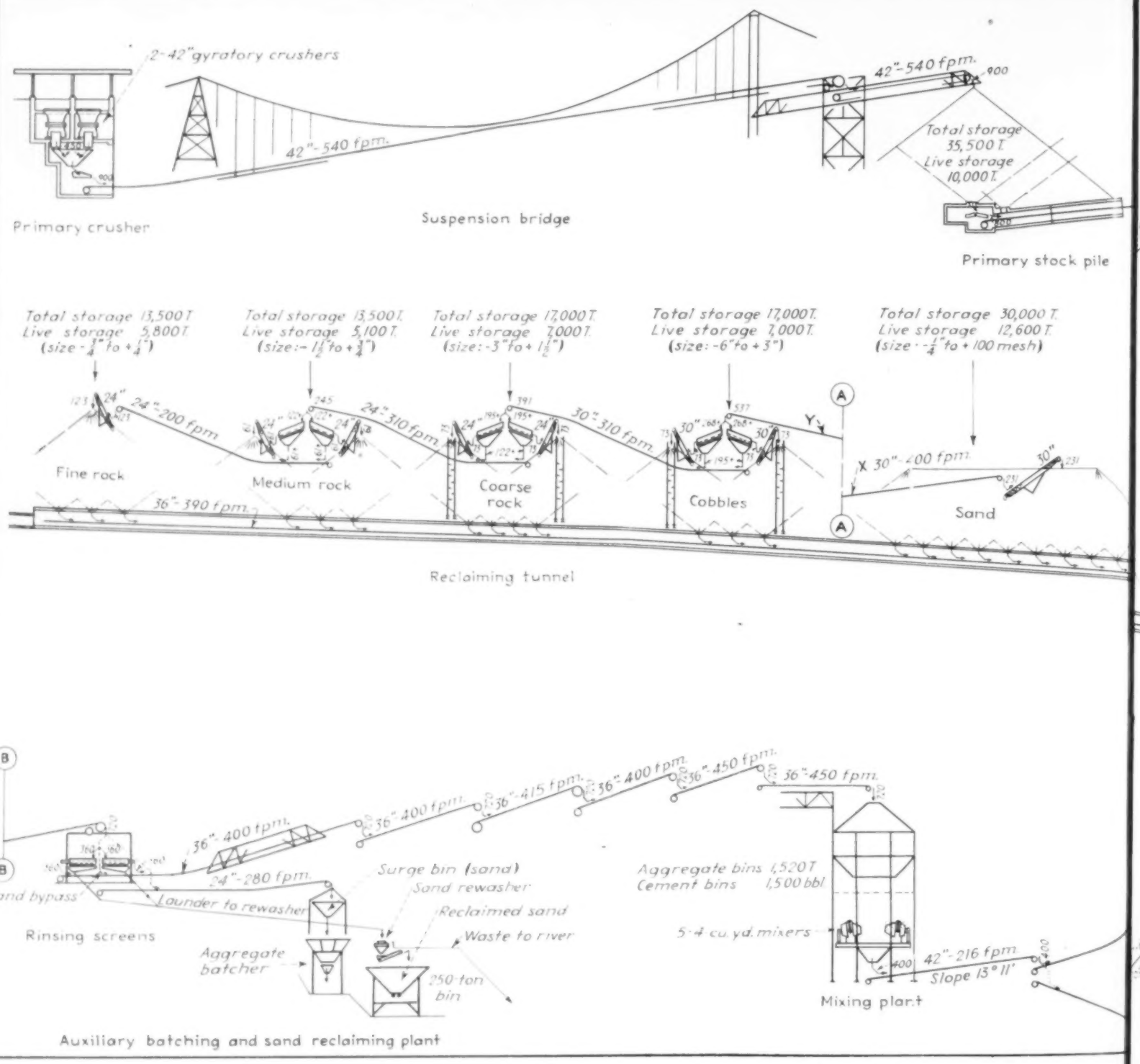
stricted level space. There was no level area near the damsite, and the plant had to be located along the edge of the river, in the valleys, and on the abutments.

Plant Capacity and General Requirements—On the basis of the required schedule it was decided to design the entire concrete plant for a rate of 8,000 cu. yd. of concrete per day, or 200,000 cu. yd. of concrete per month, based on a 25-day month. The rate of concrete production called for an output of about 15,000 tons of aggregate and sand per day, which in turn determined the size of the quarry and the capacity of the crushing and screening plant. The sand plant was designed for 240 tons per hr.

With these basic figures in mind, the entire plant was laid out and selected with the idea of eliminating any possible bottleneck in any section of the plant. Recognizing that there is a certain amount of lost time in many of the operations, the designers chose various units of equipment with hourly capacities high enough to compensate for this loss. For

FOUR TRUCKS (below) can dump at one time into two 42-in. gyratory crushers of primary crushing plant, making it possible to feed average of 900 tons an hour to two crushers. Suspension bridge carries 42-in. belt conveyor delivering crushed rock to stockpile on far side of river. From this pile, material is conveyed to two secondary crusher buildings, at left, for screening and further crushing.



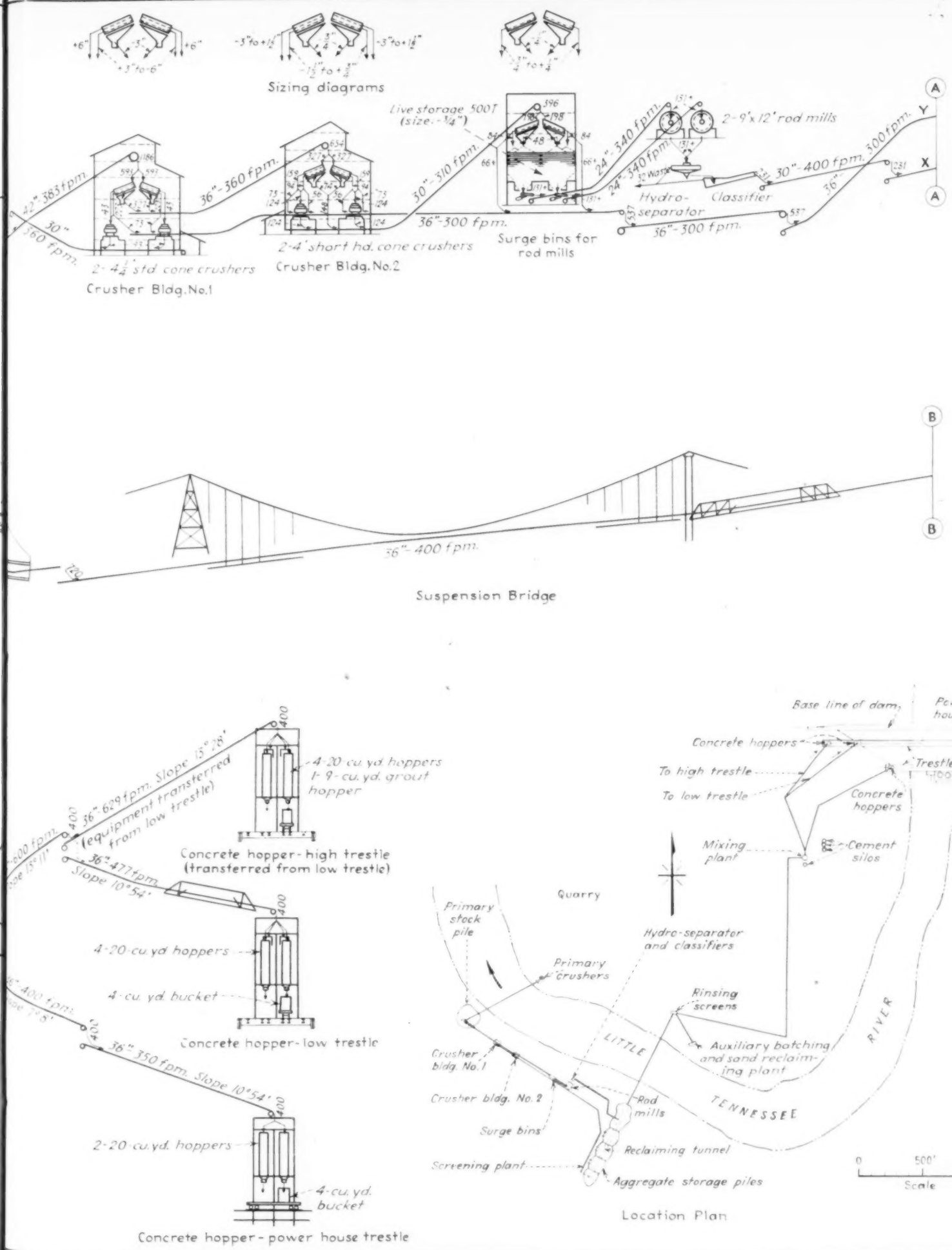


example, although the basic capacity of the crushing and screening plant is 15,000 tons per day, or about 800 tons per hour for 20-hr. operation per day, the belt from the primary crushers was designed for 1,200 tons per hr. to take care of heavy surges and to allow for hold-ups due to jamming the crushers or to delays in truck hauling. A potential bottleneck was eliminated by providing a bypass of the rinsing screens to be used for short periods in case of breakdowns, thus avoiding shutdowns of the mixing plant. Five concrete mixers were installed, although, at least in theory, four concrete mixers could just barely produce the required amount of concrete.

All units of the crushing and screening plant were installed in pairs so that, if any unit broke down, the plant could immediately be shifted to half capacity. An exception to this arrangement was a single 800-hp. motor used to drive the two rod mills. This motor was owned by the TVA, and rather than buy two new 400-hp. motors, constituting critical war material, the single 800-hp. units was used. So far no trouble has been experienced.

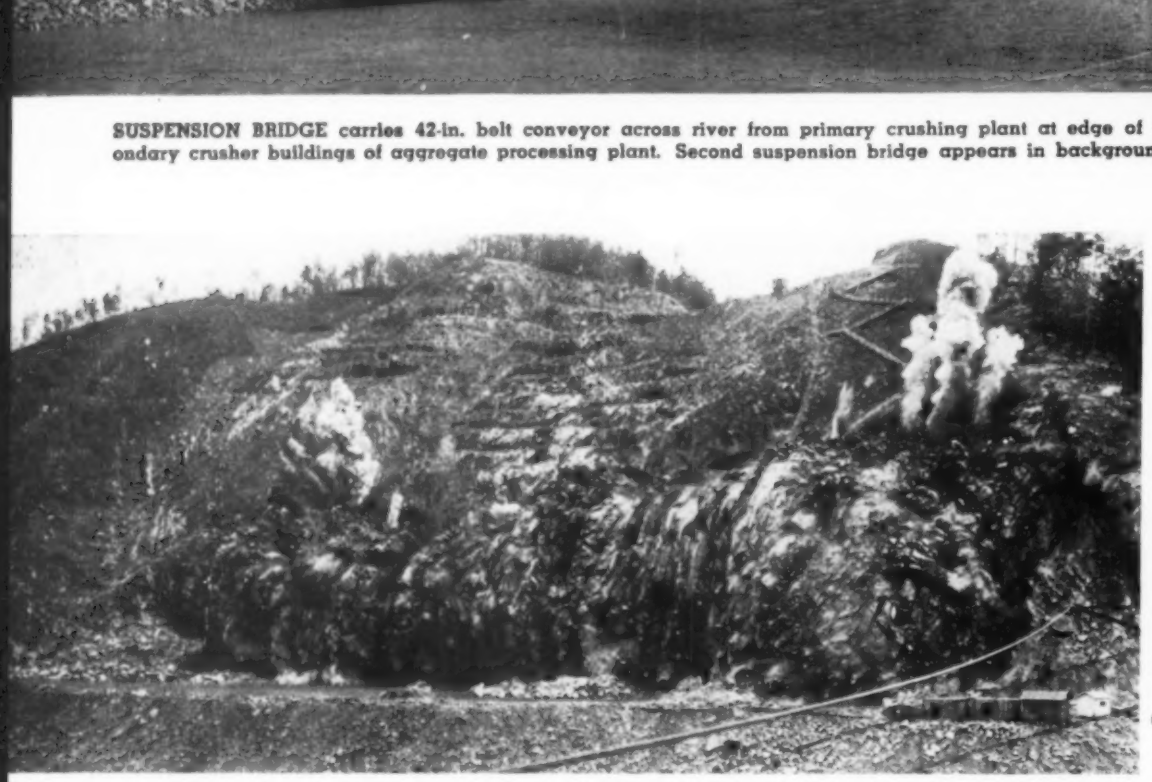
Plant layout was developed by the construction plant division of the TVA with the full collaboration and approval of the men directly responsible for building Fontana Dam. The determining factors were speed, topography, and minimum use of critical materials. Several preliminary layouts were made using different locations for the crushing, screening and storage piles, and considering both the cableway and crane-and-trestle methods of placing concrete. The location of the dam was, of course, fixed, and the quarry was located by geological conditions at a point about a mile downstream from the damsite. A number of quarry locations were prospected, but only one appeared to have a sufficient quantity of the right type of rock. The only possible location for aggregate storage was across the river from the quarry and the mixing plant, but this fact did not prove to be an obstacle because a conveyor suspension bridge was available from another TVA project, Watts Bar on the Tennessee, and this bridge was long enough to provide two necessary river crossings.

In many respects the topography lent itself to a cableway layout for placing concrete, and the use of cableways would



FLOW SHEET of aggregate processing and concrete handling plant reveals arrangement of equipment to produce 720 tons of aggregate for normal output of 400 cu. yd. of concrete per hr. Small numbers at points of discharge are tons per hour for aggregate and cubic yards per hour for concrete; they indicate theoretical capacities under normal operating conditions but not maximum capacities of equipment. Standard limits for conveyor slopes are: Aggregate conveyors, maximum slope, 18 deg.; concrete conveyors, upgrade slope, 13 deg.; downgrade slope, 11 deg. Including four stackers, 17 of plant's 31 aggregate conveyors are inclined at 18-deg. limit. Two upgrade concrete conveyors slightly exceed 13-deg. slope, as noted on drawing. Wider concrete conveyors could have been used to advantage if war shortages had not prevented. Location plan shows how plant is fitted into mountainous terrain on both sides of river, with suspension bridges supporting conveyors at two stream crossings.

SUSPENSION BRIDGE carries 42-in. belt conveyor across river from primary crushing plant at edge of quarry to stockpile location. Beyond bridge are secondary crusher buildings of aggregate processing plant. Second suspension bridge appears in background.



QUARRY BLAST by 55 tons of explosive produces 300,000 tons of broken quartzite rock containing 75 percent silica. As much as 100 tons of explosive is used in some blasts.

IN AGGREGATE TUNNEL under storage piles, gate and counterweighted chute (below) discharge material on to 36-in. belt. Tunnel, of laminated timber construction, has 22 such gates.

have had some advantages on a slower schedule; however, it was not feasible to erect enough cableways over the work to handle 8,000 cu. yd. per day. For this fast schedule, construction trestles with cranes for placing concrete were necessary. Five revolving cranes were available from other TVA projects, and two new hammerhead cranes were purchased.

Two methods of river diversion were considered. One consisted of diverting the river in three stages by timber crib cofferdams, leaving several openings through the dam to divert the river. These openings would have to be closed and concreted after the dam was finished. The other method, finally chosen, was to use diversion tunnels. It was found possible to combine the diversion tunnels with the permanent spillway and thus use the tunnels for two purposes. This method had many construction advantages such as being able to open up, excavate, and concrete the entire length of the dam in one stage, an extremely important consideration with the fast schedule. Another advantage was that the method avoided design problems in connection with closure of the openings.

Accordingly, one of the first operations to get under way at Fontana was the driving of two 34-ft. finished-diameter tunnels, one about 2,100 ft. long and the other about 1,450 ft. long. A drill jumbo, mounted on a heavy-duty truck chassis drawn by a tractor, was equipped with ten drifter drills. The full face of the heading was drilled and shot at one time. A 1½-yd. diesel shovel with short dipper stick and boom loaded broken rock into standard diesel-driven trucks which hauled the muck to the cofferdam. Driving proceeded concurrently in the two tunnels, and drilling and mucking operations were synchronized to permit

SERIES OF STACKERS (below) projecting from under sizing screens builds aggregate storage piles over reclaiming tunnel in ravine selected as best available site. Live storage in these piles is about 40,000 tons; total storage of about 100,000 tons is sometimes increased by bulldozing.

one set of equipment to handle both bores. Ventilation was provided by blowers outside the tunnels delivering air through 30-in. vent pipes extending in to the headings. Work began in April, 1942, and excavation of both tunnels was completed by the middle of August. The tunnels were excavated to about 37-ft. diameter.

One tunnel could carry the normal flow of the Little Tennessee, and each tunnel was used in turn to pass the river while concrete lining was placed throughout the length of the other. Floods several times interrupted concreting operations, but only for short periods. The two tunnels together were capable of passing 40,000 cfs. and carried that flow on at least one occasion.

Both tunnels were lined to 34-ft. finished diameter. The invert was placed first and was given special treatment by the vacuum process to produce a hard, smooth surface less subject than ordinary concrete to erosion which might result from high-velocity flow through the tunnels after the spillway goes into operation. Circular steel forms in 30-ft. sections, handled by a traveler running on a track, were used for the arch, in which concrete was placed with a pneumatic concrete gun. Truck mixers hauled

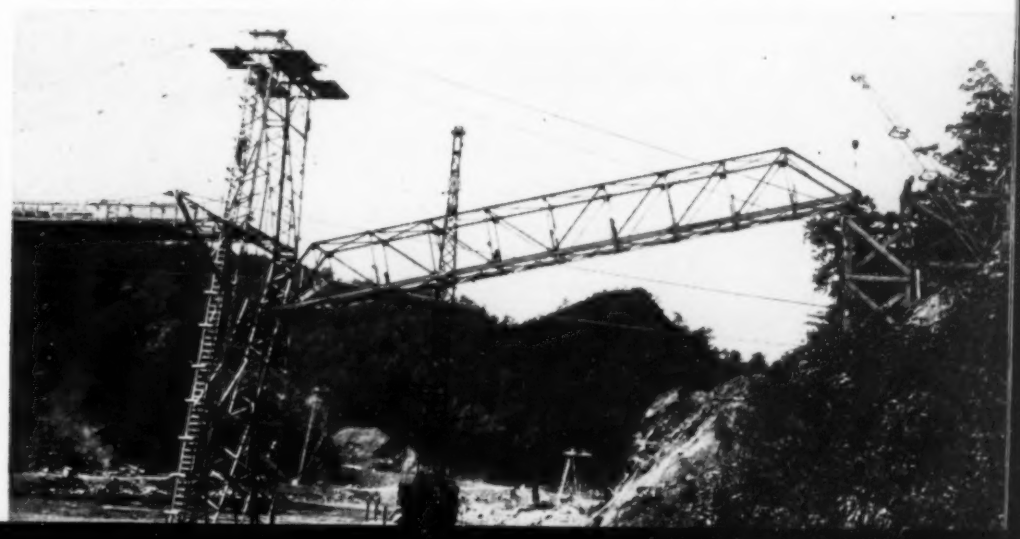
WORKING ON BENCH part way down right abutment, diesel shovels load blasted rock while wagon drills sink additional blast holes into hard quartzite. Material is hauled away by tractor-drawn wagons and trucks.

BLASTED ROCK (below) is loaded into trucks at quarry by five 3-yd. electric shovels of two makes. Trucks haul about 13 tons per trip.

MOUNTED ON TRUCK CHASSIS moved by tractor, drill jumbo (right) provides bars for ten drifters used in drilling full face of diversion tunnels excavated to about 37-ft. diameter.

30-FT. SECTION of circular steel forms for 34-ft.-dia. tunnel is assembled on traveler outside portal.

SIDE SPAN of suspension bridge for conveyor from storage piles to rinsing screens is erected by two crawler cranes.



STARTING AT TOP, diesel shovels work down slope to river level in stripping right abutment. Excavation for dam and power house totaled 965,000 cu. yd. of earth and rock.

concrete into the tunnels from a central hopper.

A 45-deg. inclined tunnel about 300 ft. long connects each diversion tunnel with the spillway above. The inclined connections were concreted in the same manner as the horizontal tunnels. An additional tunnel was driven through the right abutment to provide railroad access downstream from the dam. It will be used later for a low level outlet as part of the permanent sructure.

Excavation of the west abutment, spillway area and east abutment was carried on at the same time the diversion tunnels were being constructed. Excavation started at the top and continued down the slope of the abutments to the river bottom. By the time the work was part way down, the bottom had been unwatered, and excavation began there. Diesel shovels of 1½-yd. and 2-yd. capacity excavated the abutments, and the material was hauled away by tractors and crawler wagons plus any trucks which could be made available. Lack of a sufficient number of trucks and shovels greatly handicapped this work, and almost any mobile equipment which could be found was pressed into service. Fortunately, four electric shovels of 3-yd. capacity, purchased for use in the quarry, were delivered in the fall of 1942, and two of these were put to work excavating the bed of the river. They were too heavy to be used on the abutment slopes, however. Total rock and earth excavation for the dam, powerhouse and spillway was 965,000 cu. yd.

Simultaneously with the excavation, a stripping operation was in progress at the quarry. To expose a rock face about 450 ft. high, some 250,000 cu. yd. of overburden was removed, and the face was stripped down to the level of the quarry floor. Stripping for the quarry was performed in the same manner as for the dam abutments. At the top, as much as 75 ft. of overburden had to be removed. The rock at both the dam and the quarry consisted of quartzite with a 75 percent silica content.

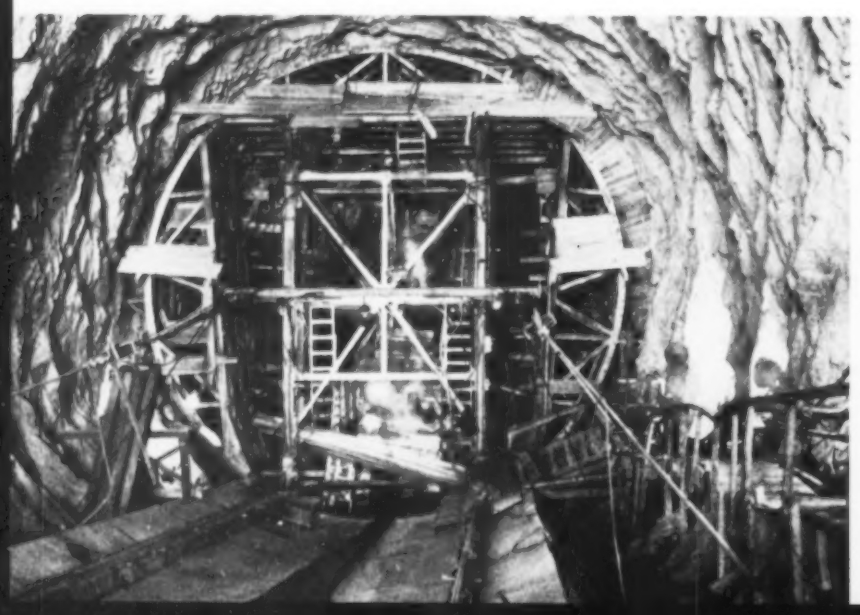
Aggregate Processing Plant

Accompanying drawings show the plant layout and the flow diagram for processing aggregate. At the primary crushing plant two 42-in. gyratory crushers discharge on to a 60x108-in. magnetic vibrating feeder. The feeder in turn discharges on to a 42-in. belt conveyor which carries the material across the river on a suspension bridge to the primary stock pile. Two trucks can dump rock simultaneously into each of the primary crushers, set side by side, permitting four trucks to unload at one time. An overhead hoist above each unit operates a heavy hook to break rock jams in the crusher. The trucks deliver about 13 tons per load and have averaged as high as 70 loads or 900 tons per hour for the two crushers.

For secondary crushing, two standard 4¼-ft. cone crushers with about 1½-in. setting and two 4-ft. short-head cone crushers with about ¾-in. setting are located in two buildings with screens above the crushers and with chutes arranged to give maximum flexibility of output. The buildings were constructed of heavy timber because structural steel was impossible to obtain. It has been

(Continued on page 132)

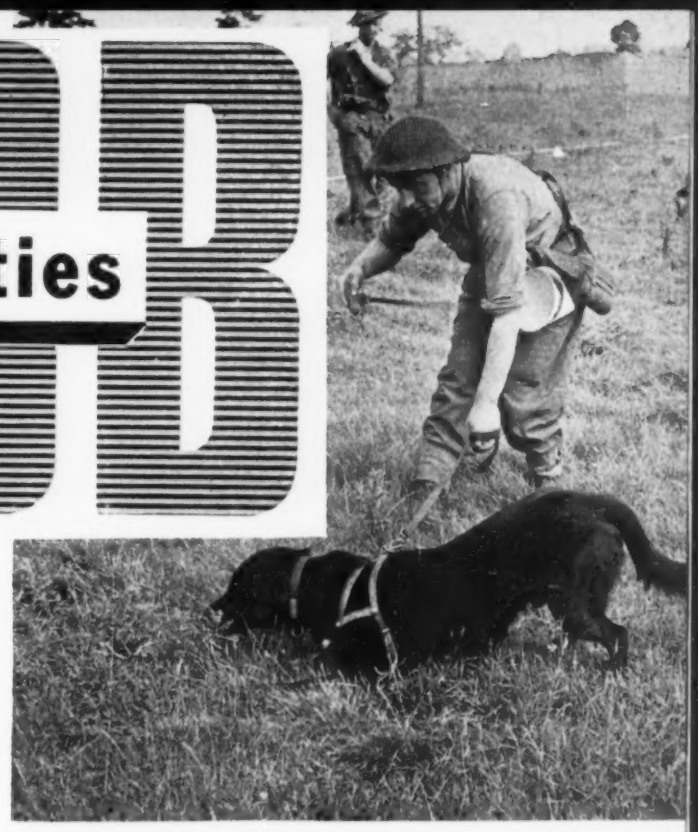
LINING TUNNEL (below) with concrete to 34-ft. finished diameter, crews first place invert and later construct arch with circular steel forms moved by traveler on steel-rail track.



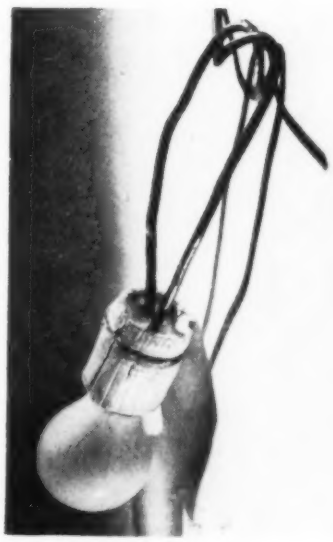
DIESEL 1½-YD. SHOVEL (below) with short boom and dipper stick loads blasted rock into diesel truck inside diversion tunnel. Equipment alternates between two tunnels driven simultaneously, one 2,100 ft. long and the other 1,450 ft. in length.

JOB oddities

ELEPHANT'S BACK provides firm and handy platform for member of U. S. Army Signal Corps construction outfit who is repairing telephone line in swamplands of Assam, India. Wide World Photo



BRITISH WAR DOG points out site of German mine in France to his handler. Twenty mine-hunting dogs can, under good conditions, clear lane 16 yd. wide at rate of 200 yd. in ½ hr. Sappers then neutralize and dig up mines which are indicated by white cones left by dog platoon. British Information Service Photo



IMPROVISED ELECTRIC LIGHT SOCKET is made by Navy's Seabees at isolated site overseas where standard materials are not available. Piece of bamboo is lined with section of metal-reinforced rubber hose threaded to engage bulb.

SLOWING TRAFFIC is this road sign which warns American Army truck drivers to keep speed down to 25 mph. on winding Ledo Road in Burma. With end of monsoon season, traffic will move more easily over mountain road to China. Wide World Photo

EASY PICKINGS are provided for this flock of chickens (below) when LeTourneau carryall scraper, hauled by Tournapull, working on state highway project, deposits its loads of earth to fill low spots on Illinois farmer's land. These early birds got plenty of worms.

Steel Cargo Ships

Are Preassembled in Sections on Skids and Placed by Gantry Cranes

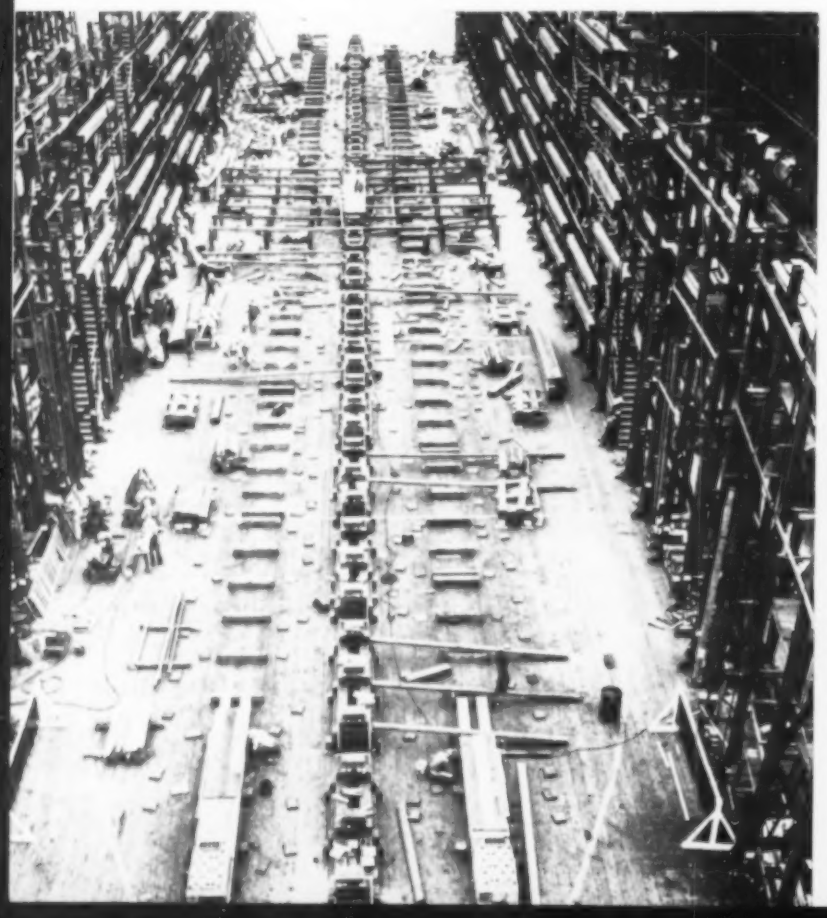
SIX SHIPYARDS of Consolidated Steel Corp., Ltd., are engaged in constructing ships of seven different types—the C-1 cargo and passenger vessels, transports, destroyers, two types of escort vessels and two types of landing craft. It was recently awarded a contract to build combat transports of an entirely new design for the Navy and the U. S. Maritime Commission.

Before the war, Consolidated was the largest independent steel fabricating company in the West. It produced structural steel for bridges, industrial buildings, elevators, tanks, pressure vessels and oil derricks. Converted to war production, it now builds ships at four plants in Southern California and two in Texas.

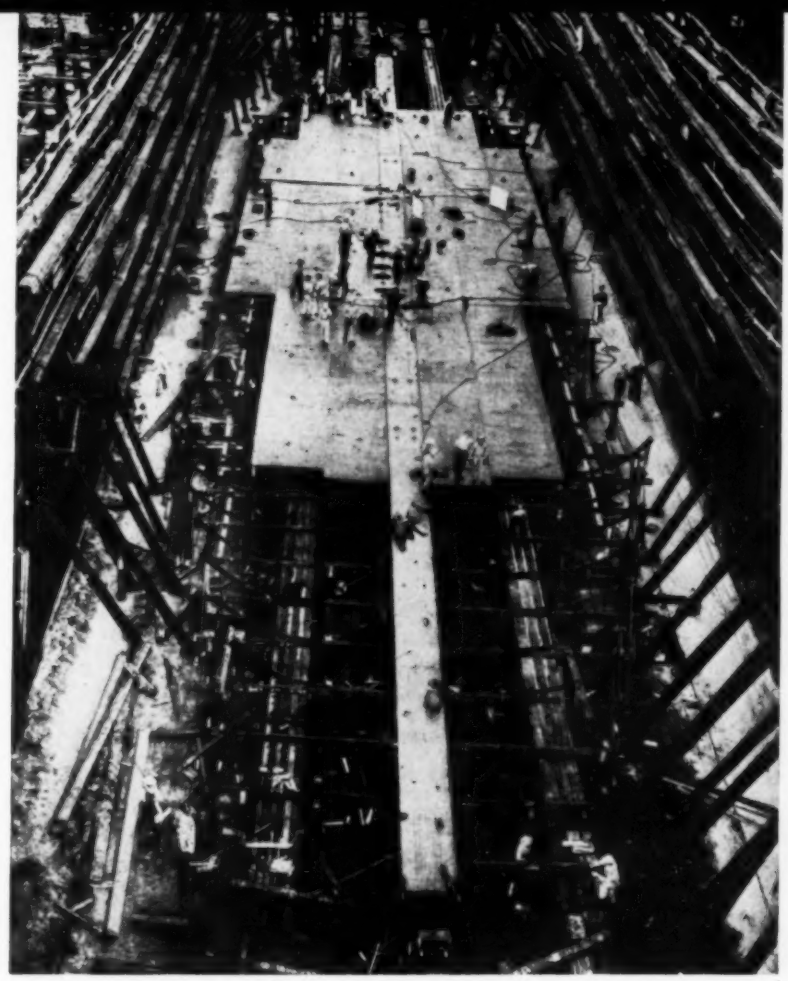
The C-1 cargo and passenger ships are built at Consolidated's $10,000,000 Wilmington, Calif., shipyard into which the first of 40,000 piles was driven Aug. 2, 1941. The yard, with its eight shipways, covers 95 acres and was constructed on a former mud flat. Complete ship sections are fabricated at the company's Maywood plant, 22 mi. inland, loaded on to trucks and delivered to Wilmington, where they are preassembled in jigs adjacent to the ways and finally assembled on the ways by use of gantry cranes.

The pictures in this issue of CONSTRUCTION METHODS and those to be printed in subsequent issues show in detail the various operations involved in the construction of a C-1 hull from the time the keel is laid until the ship is launched. Length of the C-1 hull is 417 ft. 9 in., beam width is 60 ft. and gross dead weight tonnage totals 9,125 tons.

1 WITH PRECISE ACCURACY key keel (below) is laid in place. Upon accuracy of this keel depends trueness of ship's construction.

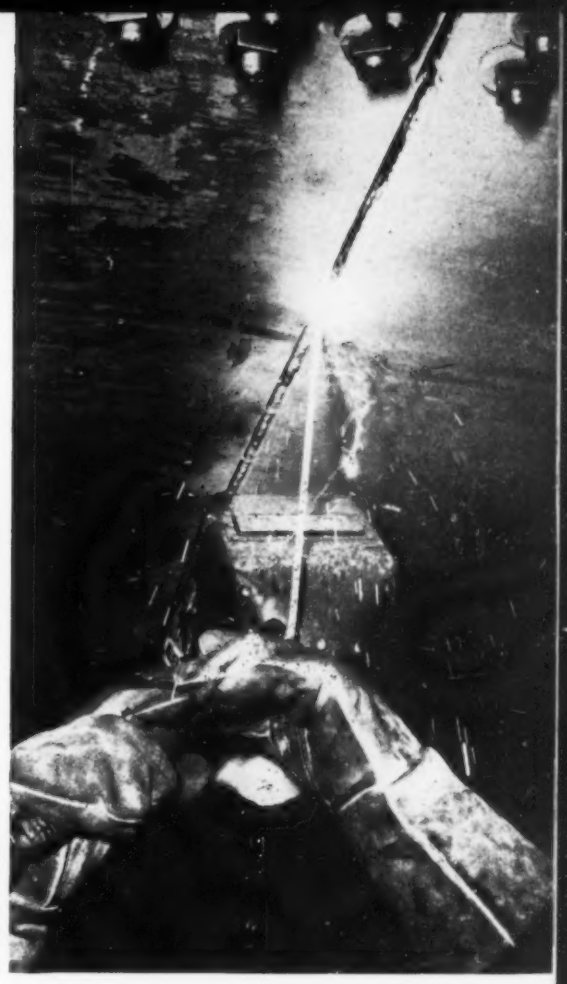


2 KEEL FULL LENGTH OF SHIP (below) is in place. Engineer with transit on platform in background, sights keel to insure its being straight.



3 **BOTTOM SHELL PLATING** (left) is welded to keel and one of first sections, an inner bottom unit, will soon be moved into place on hull.

4 WELDER (right) is running a seam. Many miles of these seams are necessary to fuse all parts and sections comprising C-1 cargo ship.

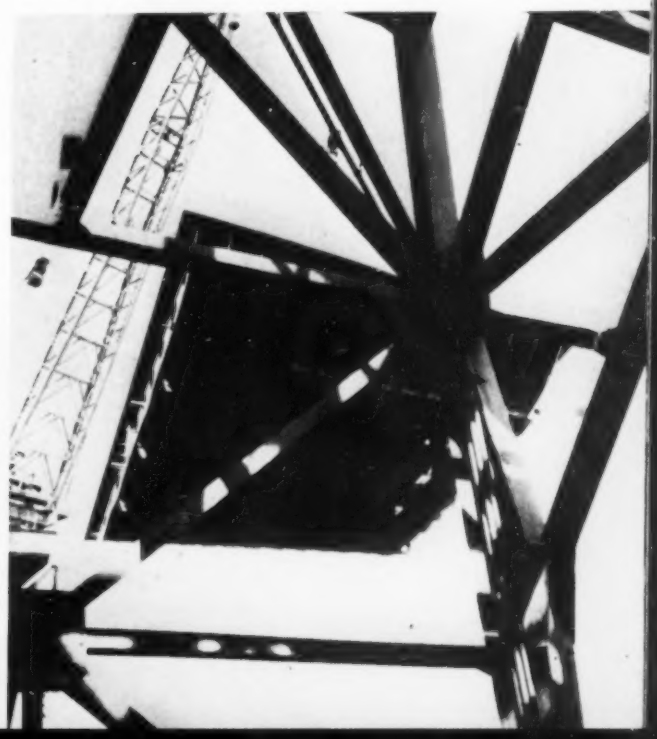


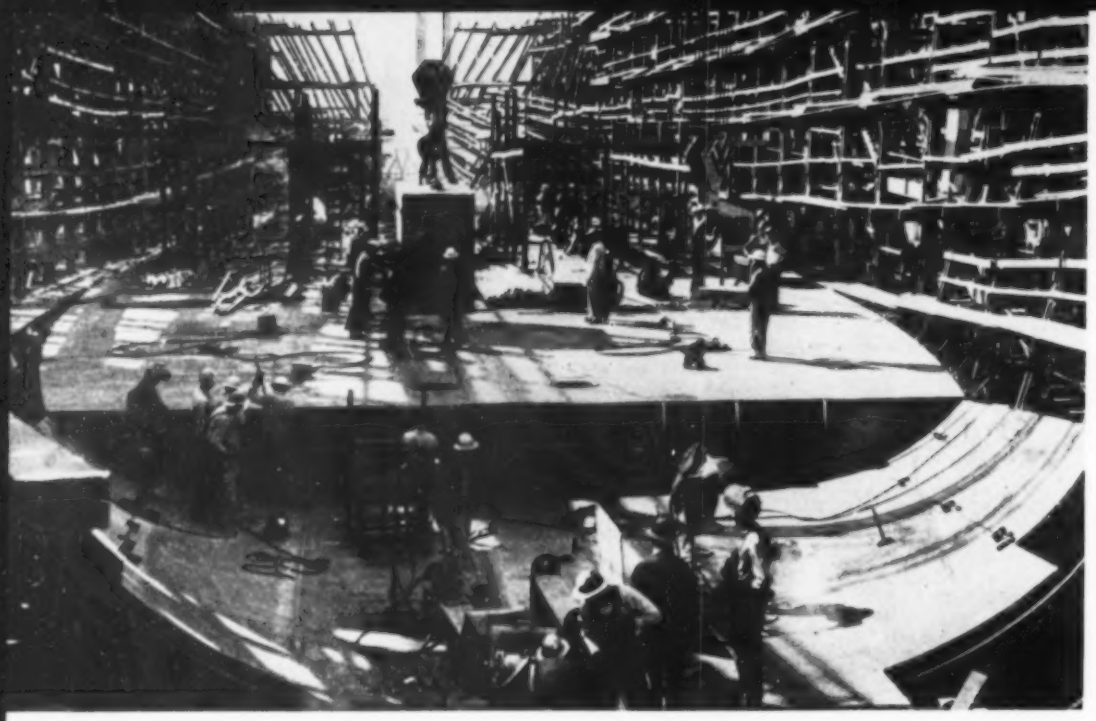
5 INNER BOTTOM UNIT (left) forming huge reservoir for fuel oil storage, is preassembled, upside down, on skids.

Continued on next page

6 TURNED ON SKIDS (below) with aid of gantry crane, inner bottom unit is ready to be conveyed to ways. Ribbed construction of double bottom acts as series of baffles to rapid shifting of fuel oil. Note weight-reducing holes and piping.

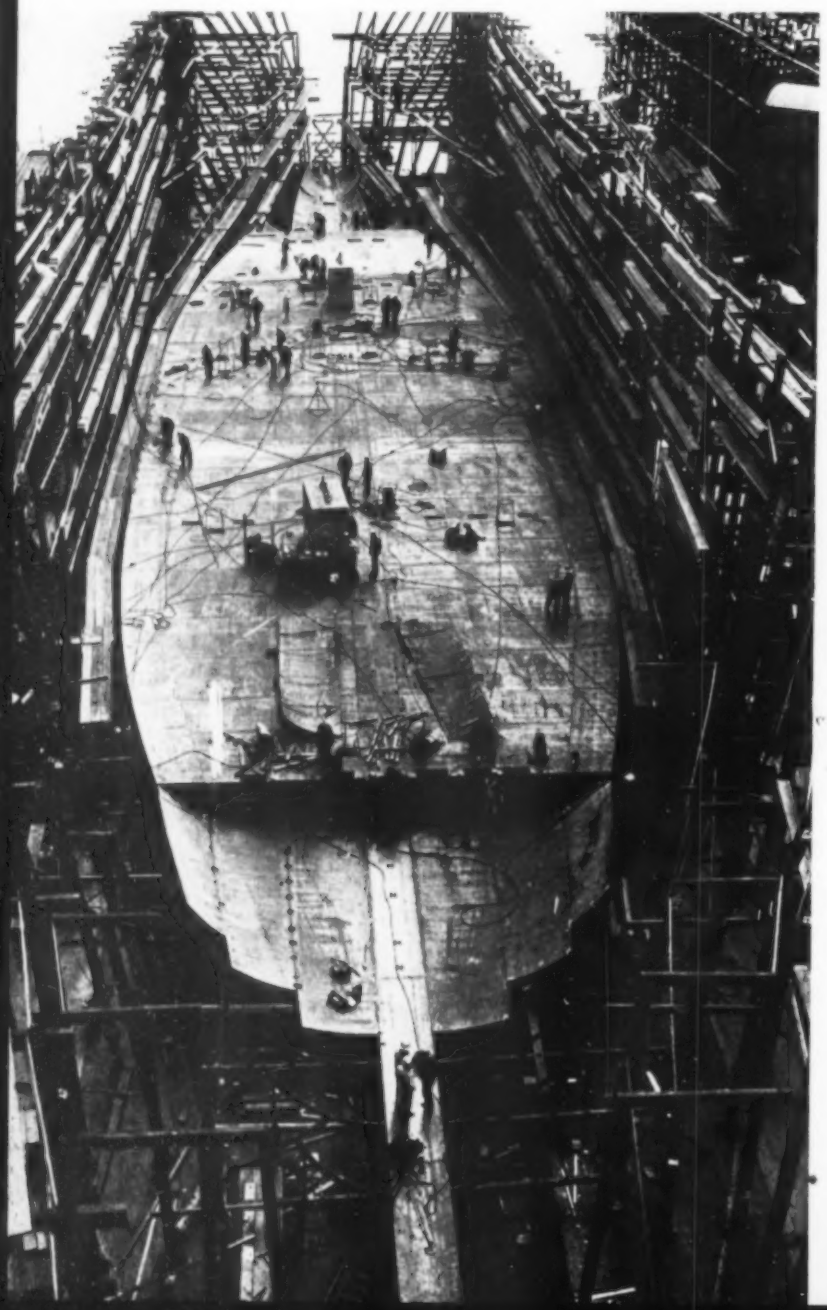
7 GIANT CRANES (below) capable of lifting 45 tons, convey inner bottom unit from skids to its position on hull of ship.



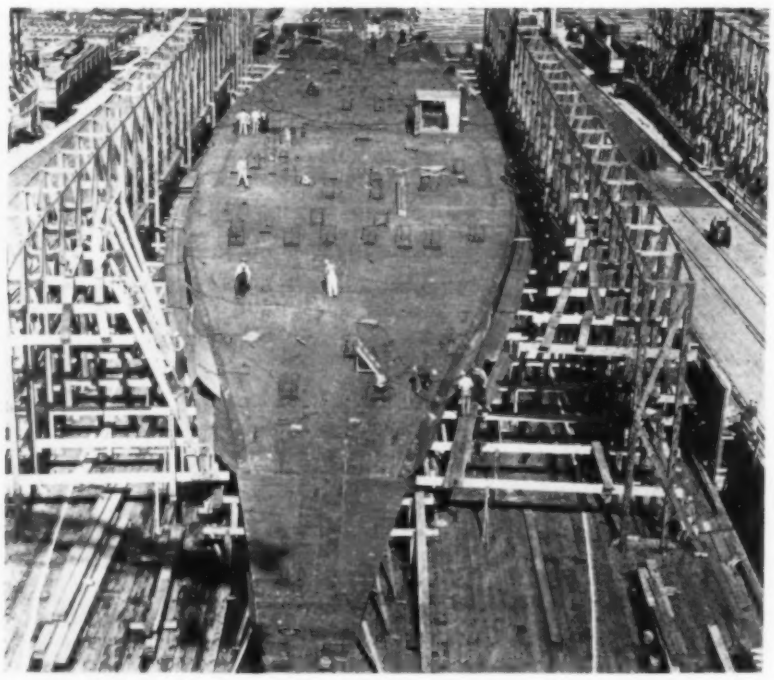


8 FIRST INNER BOTTOM UNIT is weighted down with concrete blocks preparatory to being fitted and secured to shell plating. Heavy weighembling units, it is necessary to make adjustments though extreme care has been exercised in preass section to shell plating.
by trimming and shrinking before welders can fuse are sometimes used to expedite fitting. Even

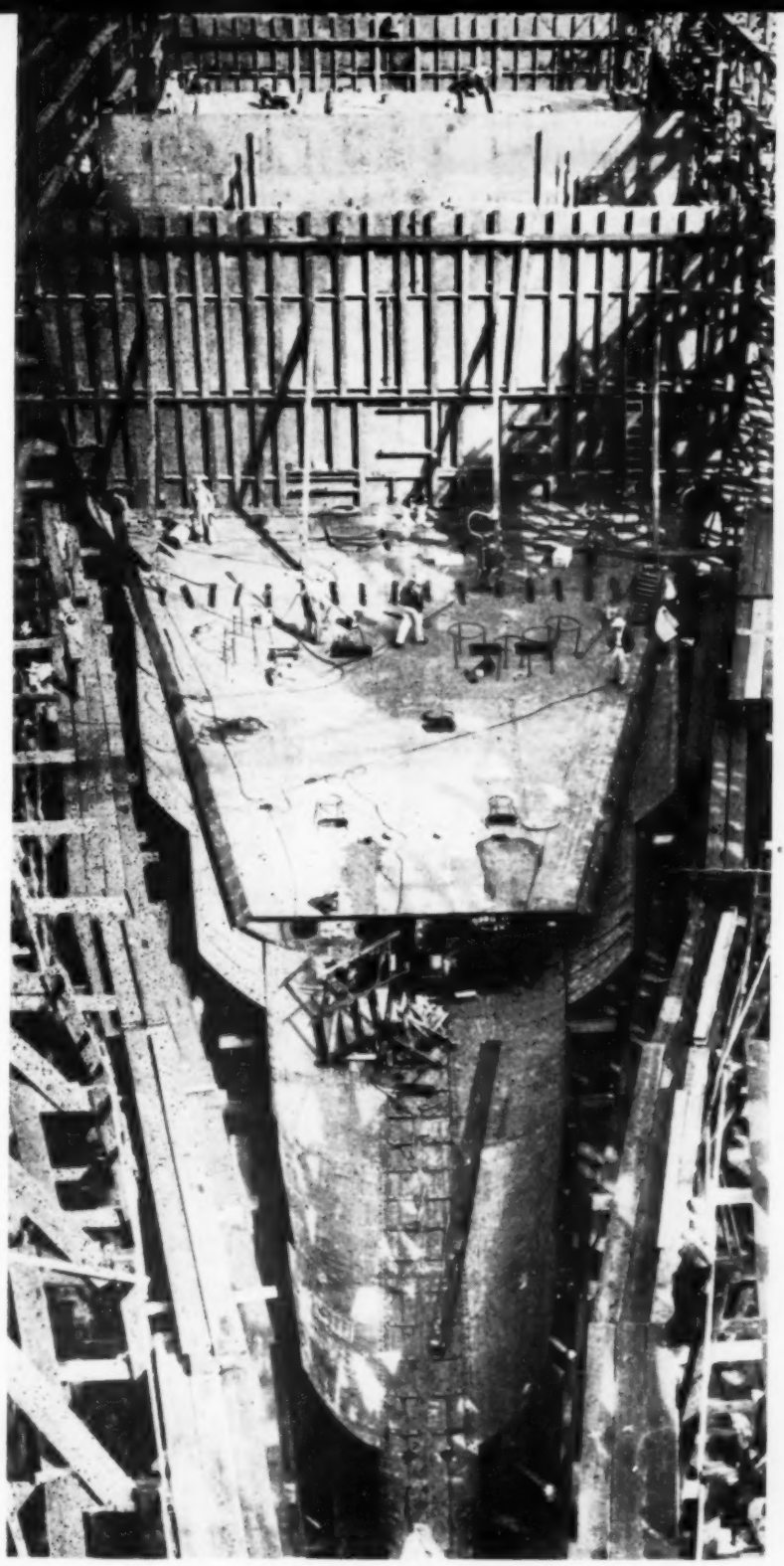
INSTALLATION of inner bottom units (below) is nearly completed. Of 20 units in C-1 hull, several are preassembled together, thereby reducing actual number of unit installations to 11.



10 ALL INNER BOTTOM UNITS (below) in place form tank top of ship. Manholes and drain wells provide access into inner bottom while under construction.

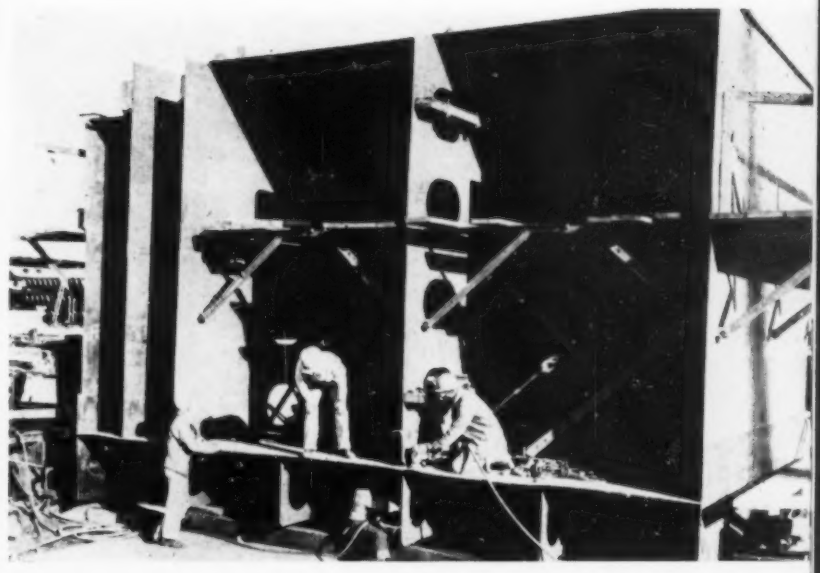


11 BULKHEAD (below) is lowered into position. Angle-iron stiffeners add structural strength. Shelfplate, running transverse to stiffeners, shows where deck lands. Under present construction sequence, bulkheads rise vertically from tank top before it is complete.



12 LOOKING AFT, several major bulkheads are seen in place. There are six major bulkheads in C-1 hull. Those running athwartship are called transverse and those running parallel with line fore and aft are termed horizontal bulkheads.

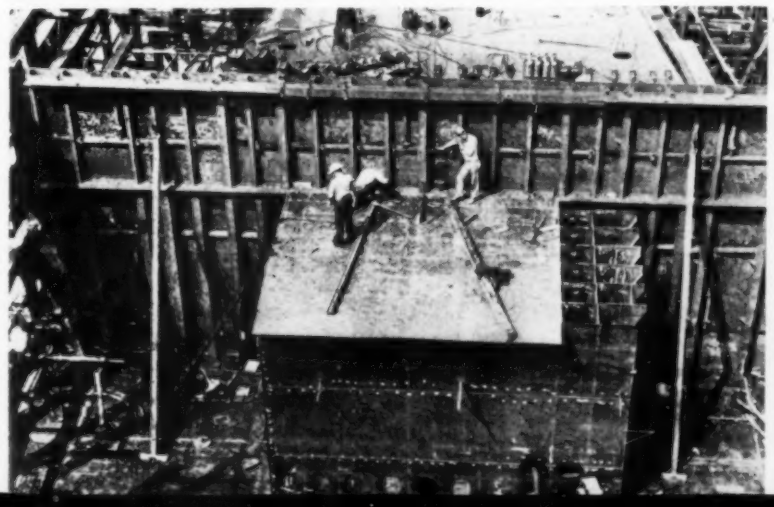
13 STEEL PLATING is transported from storage yard to job by Lorain truck-crane.



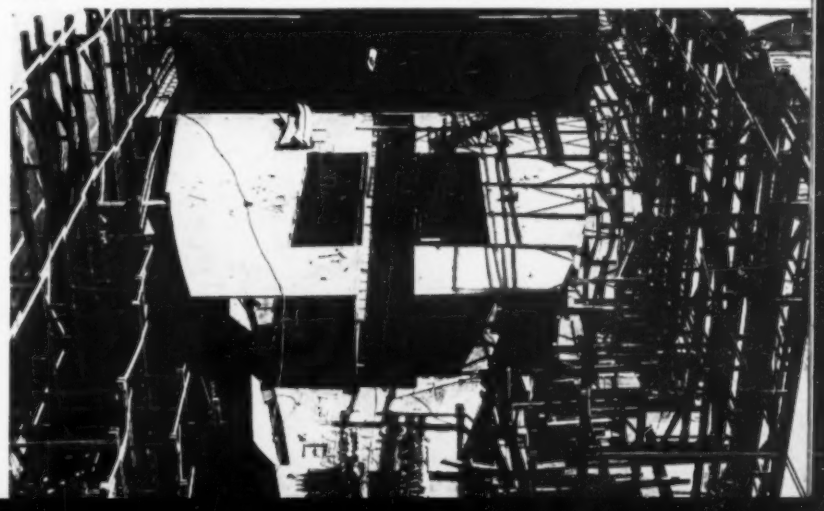
14 FRESH WATER TANK is preassembled on skids. Baffle plates inside tank retard rapid shifting of water in completed vessel.

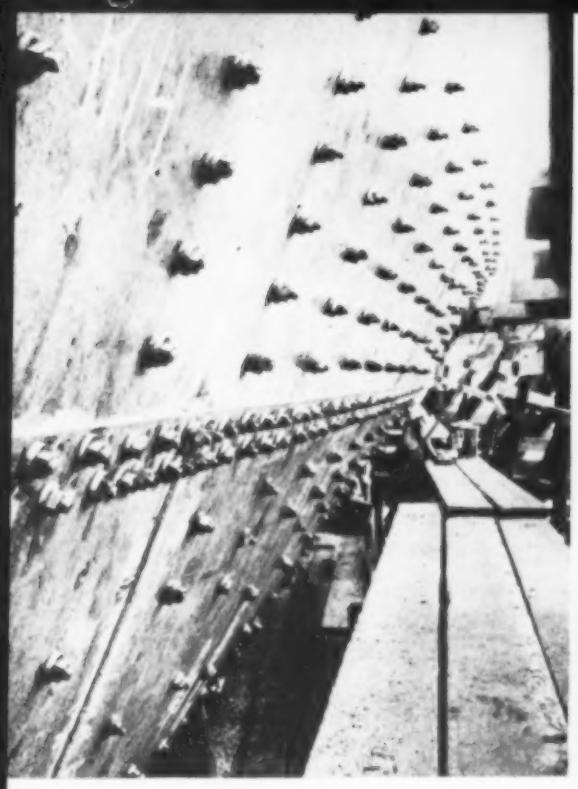
Continued on next page

15 TANK IS PLACED fore of bulkhead on hull. Manholes are provided to make fresh water tank accessible from outside.



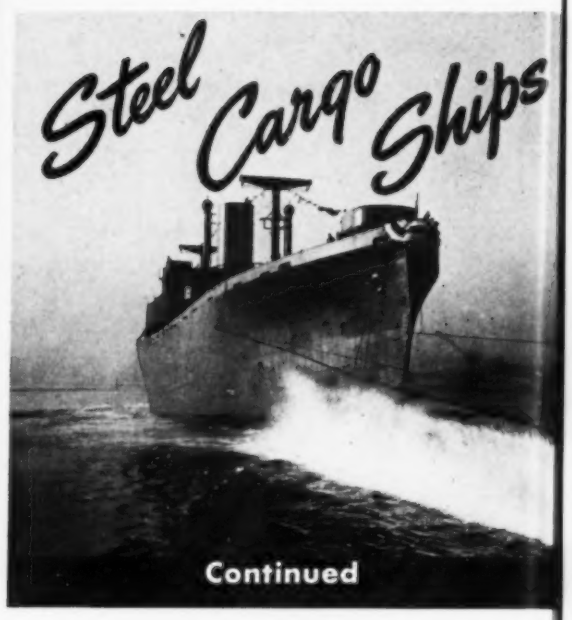
16 DEEP TANKS, preassembled on skids, are in position. Between them runs alley which will house drive shaft of vessel.



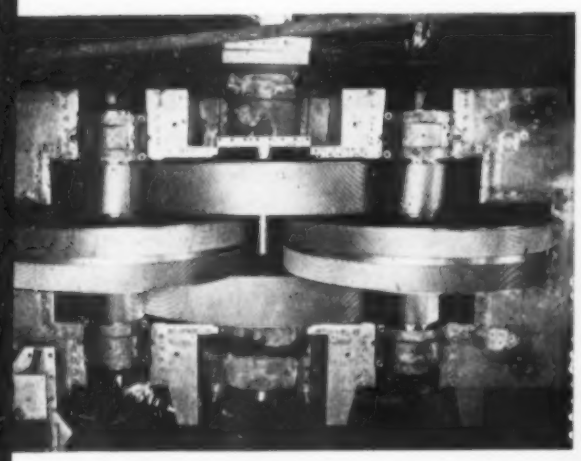


17 SHELL PLATING is temporarily bolted into place on hull, preparatory to riveting.

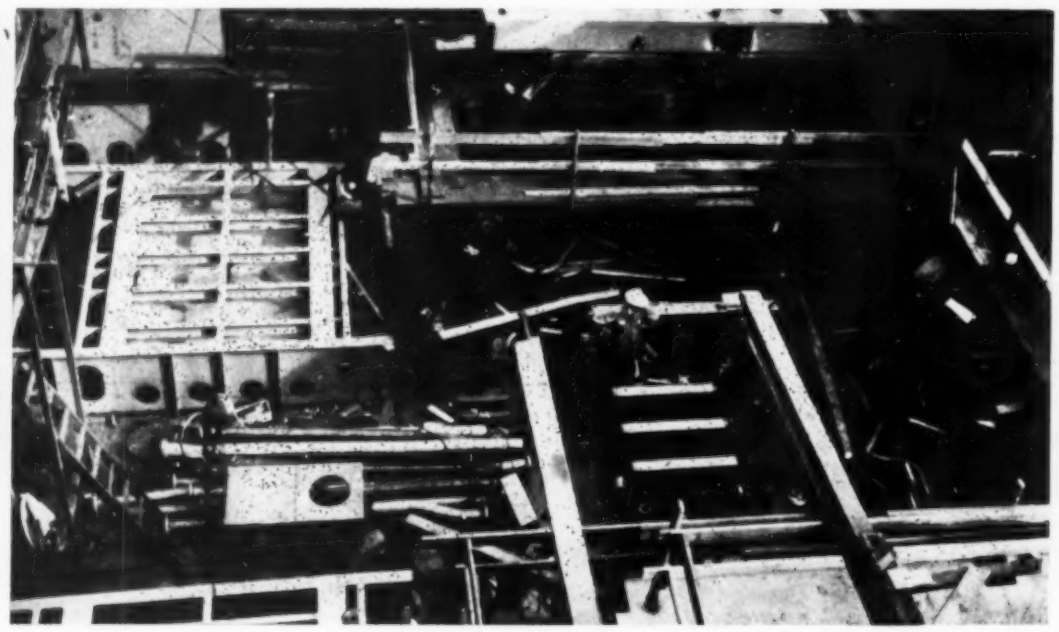
18 BOLTS inserted by shipfitters are removed by riveting crew and replaced by hot rivets inserted from inboard side. Riveting is done from outside of hull.



19 IN ENGINE ROOM (below) are various foundations which will support propulsion and operating machinery. Many machinery units were formerly installed after launching. Now ship is literally built around engine room and its various machines.

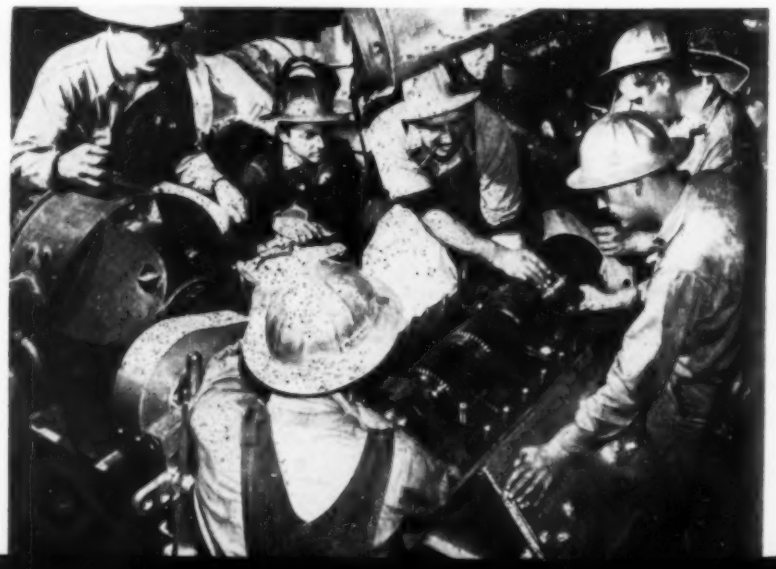


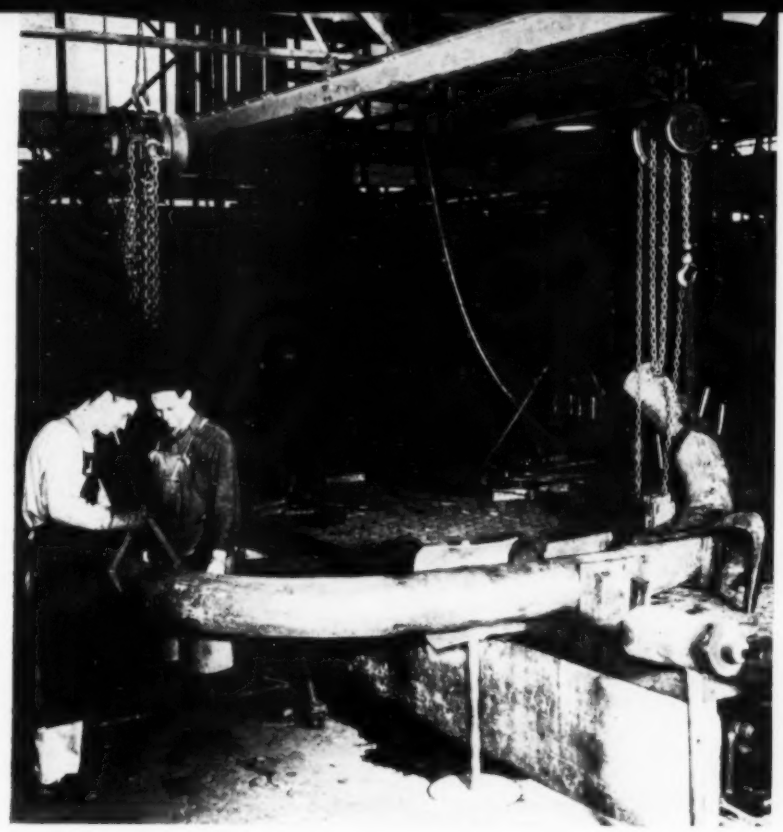
20 REDUCTION GEARS, machined to fineness of a good watch, are sealed in oil bath.



21 REDUCTION GEARS INCASED (left) are removed from mock-up house, where they were washed and checked for tolerance, preparatory to installation on ships.

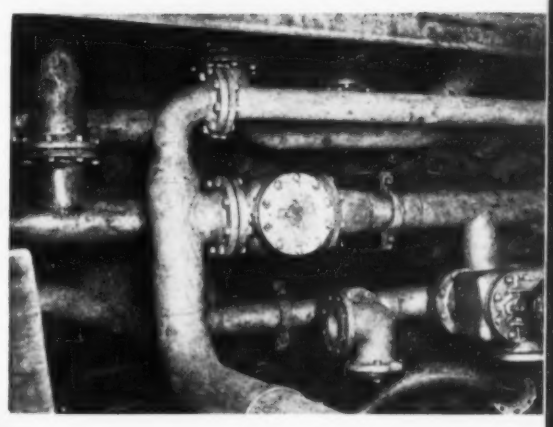
22 MACHINISTS (below) check and align mesh of gears through which turbine speed is converted to driving power. Rate of reduction through these gears is about 65 to 1.



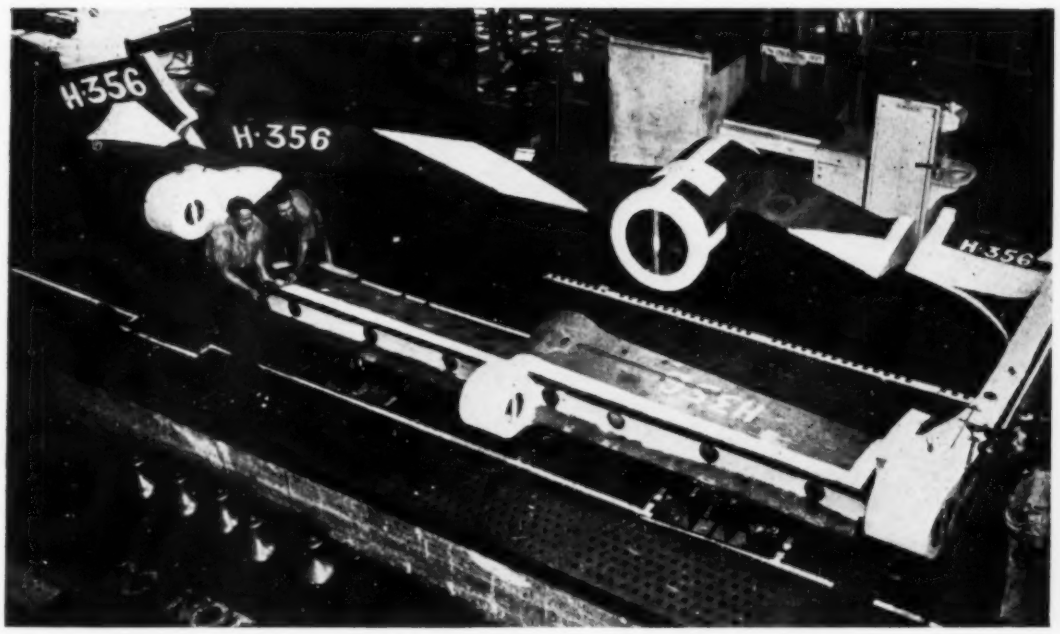


23 PIPE IS BENT (left) in shop preparatory to installation. Considerable time is saved by prefabrication and forming of pipe in shop.

24 PIPE FITTERS (right) work on main intake pipe and valve. Through it circulating water supply is taken aboard ship.



25 SMALL SECTION (right) shows intricate system of piping. There are about 12 mi. of pipe on C-1 ship.



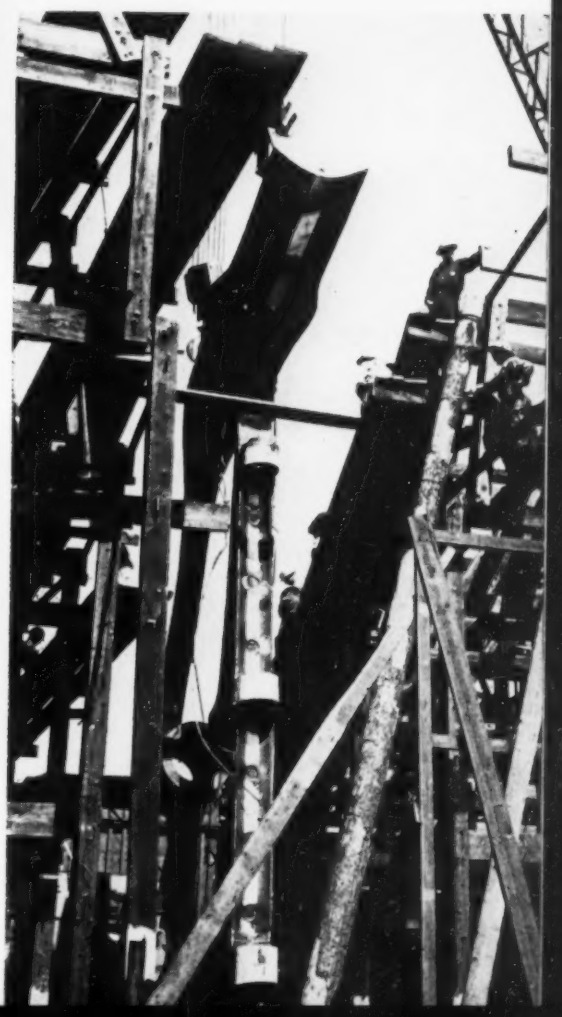
26 CIVIL ENGINEERS (left) shoot alignment points on stern casting assembly which provides main rigid support for propeller, rudder and end of shell. Jigs facilitate holding frames in position for aligning and layout.

Additional operations in the construction of a C-1 cargo and passenger vessel will be pictured in an early issue.

27 STERN CASTING (below) is assembled on skid for installation on ways. Castings for stern frame were started long before keel was laid. After necessary machining, various units are welded together. Once started, welding of this assembly must be carried through continuously to completion.

28 AFTER REMOVAL from final assembly jigs (below), weight of stern casting is about 32 tons.

29 STERN CASTING (right) is lowered into position on way. Extreme care must be taken to insure perfect alignment. Aft peak assembly will later be built to stern casting.

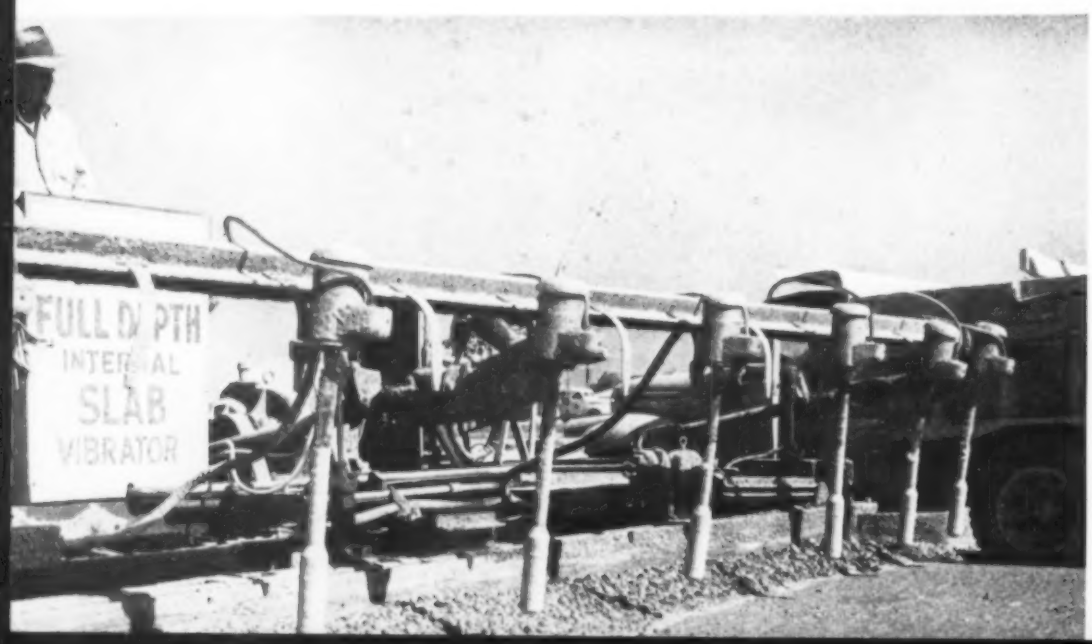


INTERNAL VIBRATION to full depth of freshly poured concrete for slab 12 in. thick is done by new type Viber machine carrying eight vibration units operating at 9,500 revolutions per min.

Full-Depth Internal Vibration

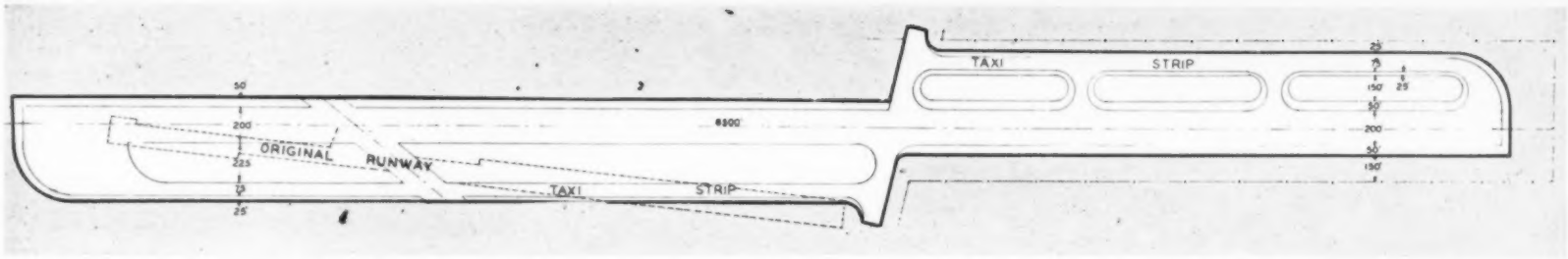
Applied to 12-In.-Thick Concrete Paving for 8,500-Ft. Airport Runway

CONSTRUCTION PERSONNEL on runway project at Lindbergh Field includes (left to right): **RHODES RULE**, consulting engineer; **J. F. L. BATE**, field engineer for Consolidated Vultee; **PHIL HELSLEY**, of Smith-Emery testing laboratories; **L. G. LYNCH**, project manager; **L. G. KRULL**, general superintendent, and **R. L. HAPGOOD**, concrete superintendent for Casson & Ball, contractors of Berkeley, Calif.



LIFTING BAR (below), operated hydraulically, quickly raises battery of eight vibrator units when passing expansion joint or other obstruction.

FULL-DEPTH INTERNAL VIBRATION of poured concrete slabs 12 in. thick and 25 ft. wide is a feature of the construction of a runway 8,500 ft. long and 200 ft. wide, completed recently at Lindbergh Field, San Diego, Calif., as a joint undertaking of the Consolidated Vultee Aircraft Corp. and the Navy Department. The super-thick slab is designed to sustain wheel loadings of 175,000 lb. imposed by the largest types of airplanes now contemplated. In addition to the long main runway the project includes taxi lanes 75 ft. wide and of the same thickness as the landing strip they parallel, and an intermediate area 225 ft. wide

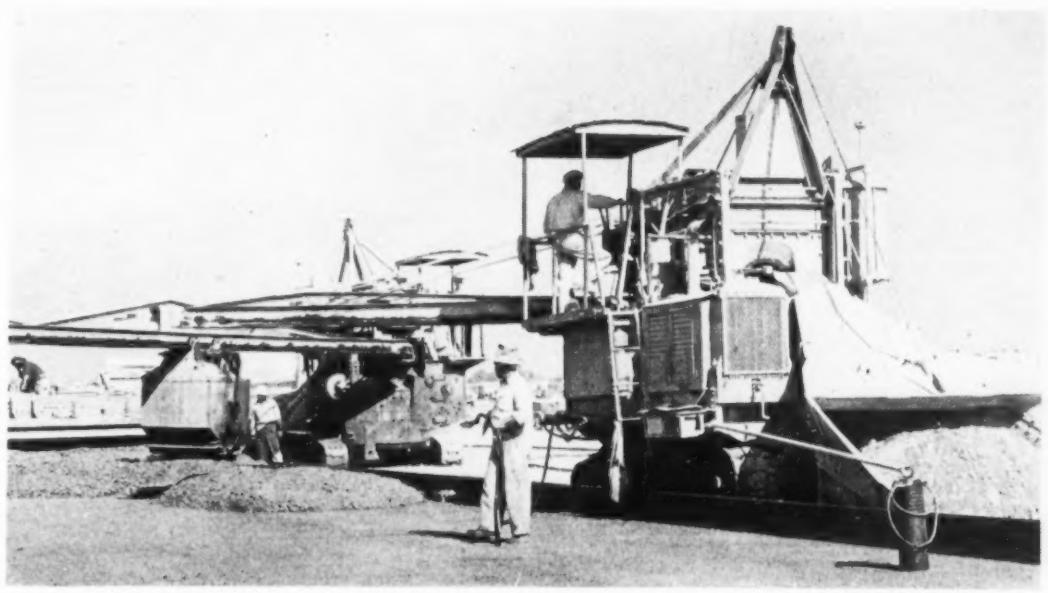


NEW RUNWAY at Lindbergh Field has length of 8,500 ft. and includes 200-ft.-wide concrete-paved main strip, 75-ft. taxi lanes and warm-up aprons. Intermediate areas and shoulders have bituminous surfacing.

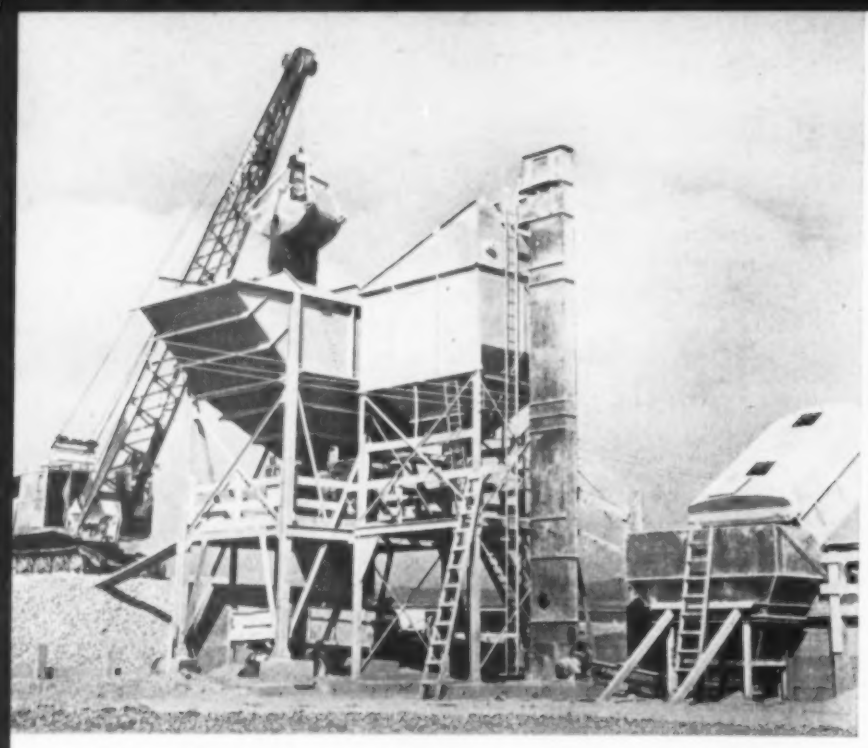
paved with asphaltic concrete from 3 to 5 in. thick and provided with catch-basins to handle storm water during extreme conditions. Similar bituminous paving is specified for 50-ft. wide shoulders along the runway and 25-ft. shoulders along the taxi lanes. In the aggregate this project represents a total paved width of 575 ft. for the entire 8,500-ft. length of the runway, equivalent to a 22-ft. wide highway nearly 42 mi. long. The strip runs east and west to take advantage of prevailing winds in this area. While the thickness of the concrete is generally 12 in., it is increased to 14 in. at the easterly end of the runway to provide for additional loads in the warm-up area.

Engineers for the project were faced with difficult sub-soil conditions. The entire runway is constructed on a dredged fill placed on tidal flats which contain a large proportion of highly plastic clays. A well-point system on the westerly portion of the runway was used to de-water

CONCRETE FOR 25-FT. LANE of 200-ft. wide runway (below) is placed by three 34E Multi-Foote pavers.



SUCCESSIVE STEPS in paving of concrete runway in 25-ft. lanes at Lindbergh Field include (from front of photo toward rear): (1) Placing of concrete from booms of Multi-Foote paving mixers; (2) spreading between forms and adjacent finished slab by Blaw-Knox machine; (3) full-depth vibration of 12-in. thick concrete by multiple-unit Viber machine; (4) cutting of joints; (5) machine finishing of concrete with Blaw-Knox unit; and (6) final hand finishing with floats from movable bridge.



BATCHING PLANT is 1,000-ton Blaw-Knox unit complete with bulk cement dump hopper, elevator, 300-bbl. cement silo and overhead bins served by clam-shell bucket on Link-Belt crane.

SPREADING OF CONCRETE deposited on subgrade by buckets of paving mixers is done by Blaw-Knox spreader.

unstable sub-surface soils in order to obtain maximum density and preliminary settlement. During these de-watering operations a maximum subsidence of 0.61 ft. was recorded, with an average subsidence of 0.21 ft. over the entire area.

Despite these handicaps, calculations based on the Westergaard formulae indicate that the runway will safely take wheel loadings of at least 175,000 lb. with 90 p.s.i. tire pressure. Design wheel loading was 85,000 lb. The higher allowable calculated loading results from the high flexural strength in the concrete obtained through rigid concrete control and high modulus of sub-grade reaction obtained by careful selection and compaction of sub-base materials.

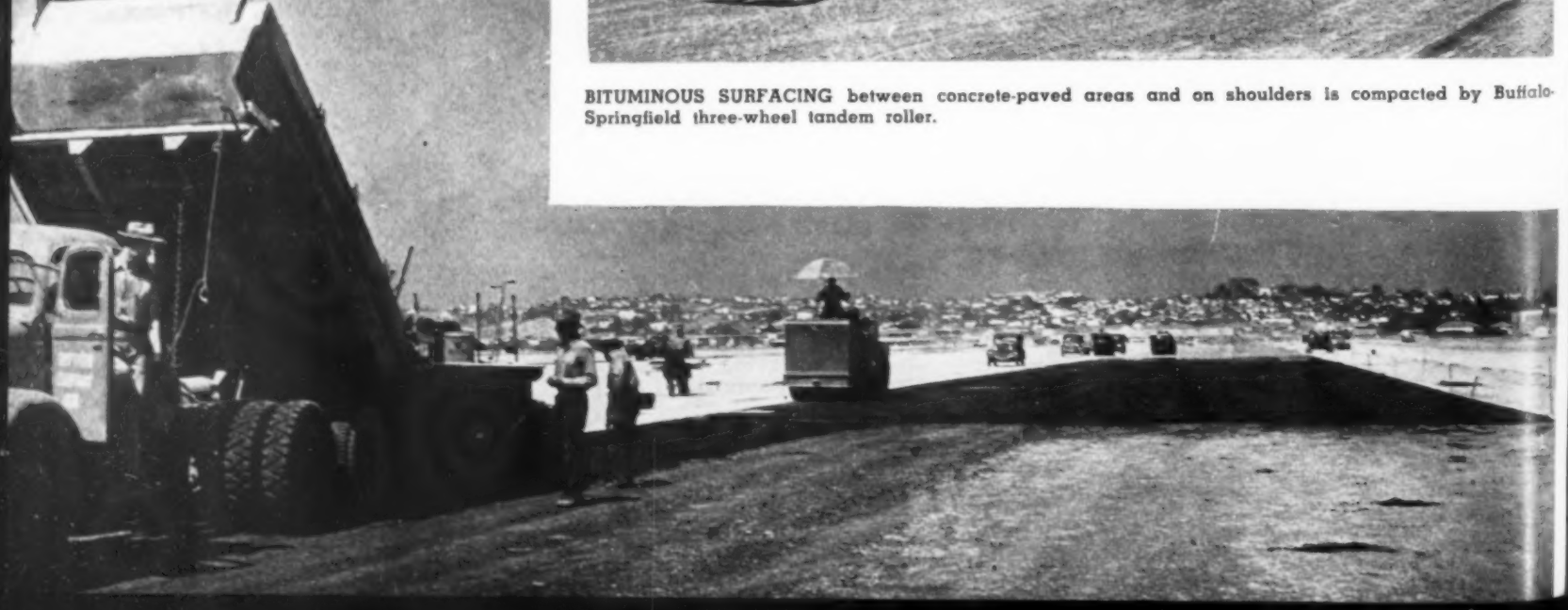
For the grading and paving of the new airfield runway a $2,500,000 contract was awarded to Casson & Ball, of Berkeley, Calif. Concrete for the runway paving operations was proportioned at a 1,000-ton Blaw-Knox batching plant, complete with cement dump hopper, elevator and 300-bbl. bulk cement silo. Aggregates were handled by a Link-Belt crane with 1½-cu. yd. clamshell bucket. Mixing was done by three 34E Multi-Foote pavers which dumped 1½-yd. batches on the prepared subgrade, for spreading by a Blaw-Knox spreader between steel road forms set 25 ft. apart. The spreaders were followed, in turn, by the Viber full-depth, internal, multiple-unit vibrating machine and by a Blaw-Knox finishing machine.

For the intermediate bituminous-surfaced areas and for shoulders adjacent to the concrete runway and taxi lanes the material for the 3-5-in. top course was

(Continued on page 122)

INTERMEDIATE AREAS between concrete runway strip and taxi lanes (below) receive bituminous surfacing 3-5 in. thick applied by Barber-Greene machine fed by 7½-ton asphalt truck.

BITUMINOUS SURFACING between concrete-paved areas and on shoulders is compacted by Buffalo-Springfield three-wheel tandem roller.

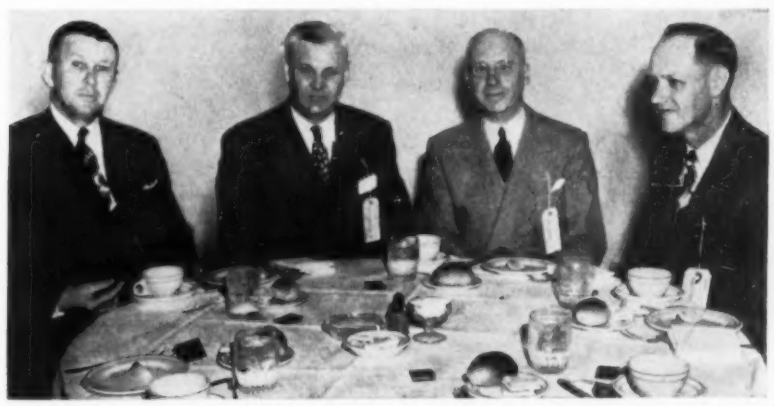


Present and Accounted For...A PAGE OF PERSONALITIES

NORTH CAROLINA STATE OFFICIALS inspect TVA's Fontana Dam, 480-ft. structure now nearing completion on Little Tennessee River in North Carolina mountains. On visitors' inspection balcony are (left to right): CHARLES WARD, acting chairman, state highway commission; FRED C. SCHLEMMER, TVA project manager; GOVERNOR J. MELVILLE BROUGHTON; D. HIDEN RAMSEY, editor, Asheville Citizen-Times; W. VANCE BAISE, chief engineer, state highway commission; OREN REED, Fontana Dam construction engineer; T. BOODIE WARD, director, state motor vehicle bureau; HENRY B. SHERRILL, Fontana camp manager; DR. J. C. GAMBLE, Fontana health officer; WILLIAM N. ROGERS, Fontana personnel officer; and G. E. MURPHY, Fontana construction superintendent.

NAMED VICE-PRESIDENT and general manager of The Austin Co., engineers and builders, Cleveland, Ohio, is LAURENCE E. COONEY, who joined this orgnaization in 1919. From 1941-43 he was project manager on construction of Bell Aircraft Corp. and in 1943 became district sales manager.

LEGION OF MERIT is pinned on BRIG. GENERAL LUDSON D. WORSHAM for outstanding services as Division Engineer, Great Lakes Divison, Chicago, from May, 1942 to April, 1943. At present he is Assistant Chief of Engineers in charge of troops, with headquarters in Washington. Pictured (left to right) are: MAJOR GENERAL THOMAS M. ROBINS, Deputy Chief of Engineers; LIEUT. GENERAL BREHON B. SOMERVELL, commanding general, Army Service Forces; GENERAL WORSHAM; and MAJOR GENERAL EUGENE REYBOLD, Chief of Engineers.



NEWLY ELECTED OFFICERS of Associated General Contractors of Arkansas are shown with principal speaker, F. T. BROWN, at annual meeting. They are (left to right): H. L. DICKINSON, president; D. F. JONES, vice-president; MR. BROWN; and RAY METZGER, secretary-treasurer.

EXECUTIVE COMMITTEE of Associated General Contractors of America for 1944 comprises (left to right): F. W. PARROTT, OSCAR B. COBLENTZ, E. A. BANISTER, G. W. MAXON, D. W. WINKELMAN, H. E. FOREMAN, WILLIAM MUIRHEAD, MRS. C. S. McCARTHY, H. A. DICK, C. S. EMBREY, DAN W. KIMBALL, E. M. RUST, M. W. WATSON, W. S. BELLOWS, and F. L. SHACKELFORD.

AIR BASE CONSTRUCTION IN FOREIGN LANDS

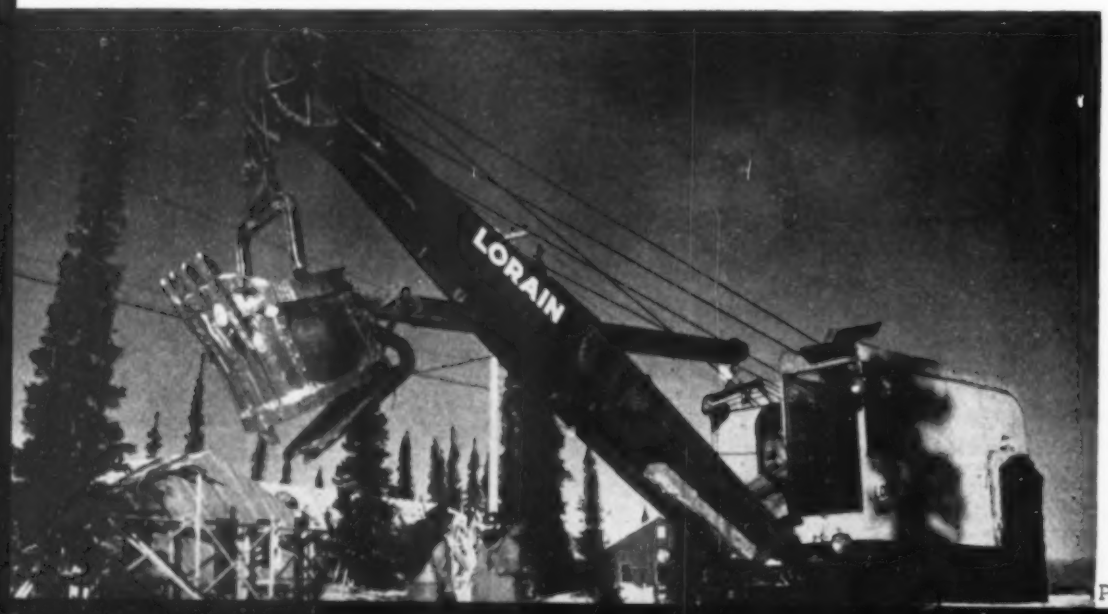
The accompanying illustrations have been selected from hundreds taken by Ivan Dmitri, ace photographer and war correspondent, to illustrate his book "Flight to Everywhere", published this month by Whittlesey House, a division of the McGraw-Hill Book Co., New York.

Mr. Dmitri recently completed a trip of 32,000 miles, flying the Army's Air Transport Command routes over five continents. His book telling a dramatic story of the men who ferry bombers, fly men and materiel to combat areas and establish air bases around the world, contains 450 photographs, including 150 in full color, from which a few, dealing with construction of airfields, hangars and bases, are reproduced herewith. EDITOR

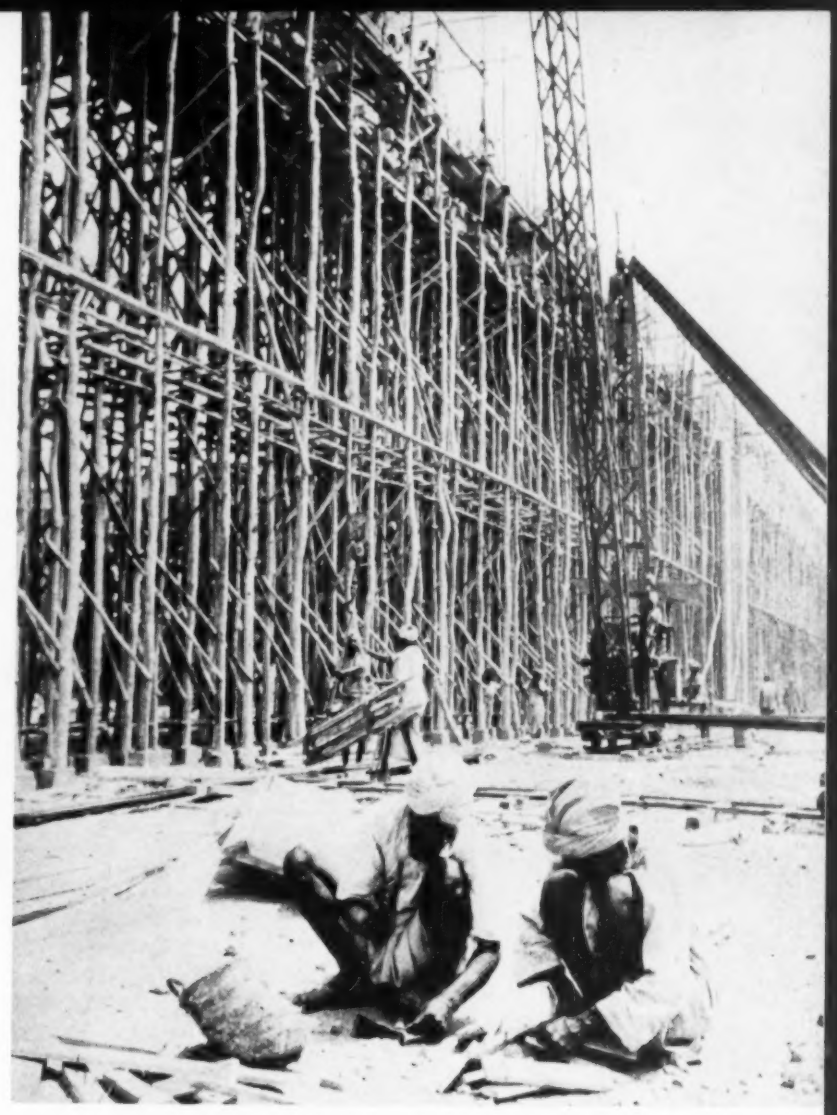
NATIVE WORKERS (left) take a "breather" during construction of airfield at Khartoum in Anglo-Egyptian Sudan.

PERILOUS PERCH at airfield in Agra, India, is occupied by barefoot native (right) manipulating crude homemade saw to cut planks from large timber.

AT GOOSE BAY, LABRADOR, Air Transport Command installation of woodframe buildings, airport facilities and roads utilizes services of crawler-mounted Lorain diesel power shovel (below).



USING THEIR HEADS in literal sense are these natives of Africa's Gold Coast here seen transporting materials for ATC installation.



HANGAR CONSTRUCTION at Karachi, India, involves extensive use of pole scaffolding and movable stiff-leg derrick for handling materials.

HERE'S WHERE THE CAMEL WALKS A MILE (left) reversing former advertising slogan of well-known American cigarette. Load from ATC plane at Karachi airport in India is transferred to primitive camel cart sporting modern touch in form of rubber-tired wheels.

Continued on next page

AT NATAL, BRAZIL, natives use primitive two-man carrying trays (below) instead of wheelbarrows, to handle earth.

DELUXE TRAVEL is enjoyed by Indian workers (below) on Bengal-Assam railway as they use umbrellas to ward off sun's rays while delivering trainload of stone for airport surfacing.

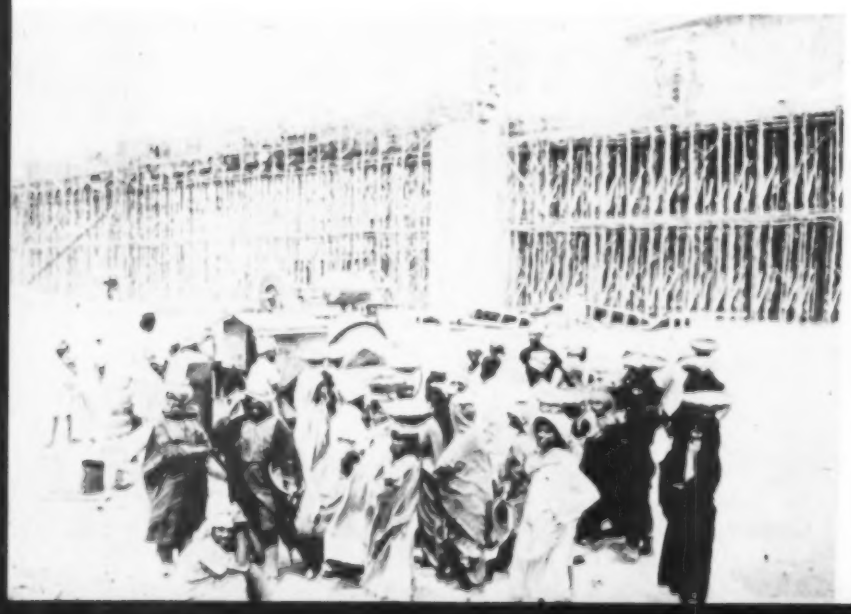
SYSTEMATIC MAINTENANCE of airport runways in Assam, India, is performed by natives using wicker baskets for carrying stone for filling holes or ruts in surfacing upon which heavy bombers land.

More pictures of construction for Air Transport Command bases in foreign lands, taken by Ivan Dmitri to illustrate his book "Flight to Everywhere" published this month.

STONE BASE for airport runway in Assam, India, is laid by native laborers using ever-present wicker basket for carrying materials.

AMERICAN TRUCKS and Sudanese labor help work of extending airfield runway at Khartoum.

FROM MECHANICAL MIXER (below) at Karachi, India, women carry concrete in headpans to site of airplane hangar which is being constructed by Air Transport Command.



A HINT TO HAT STYLISTS of Paris and New York should be conveyed by this view (below) of women natives of India balancing on their heads basketfuls of earth for airport construction at Karachi.

U.S. Army Engineers on Italian Front

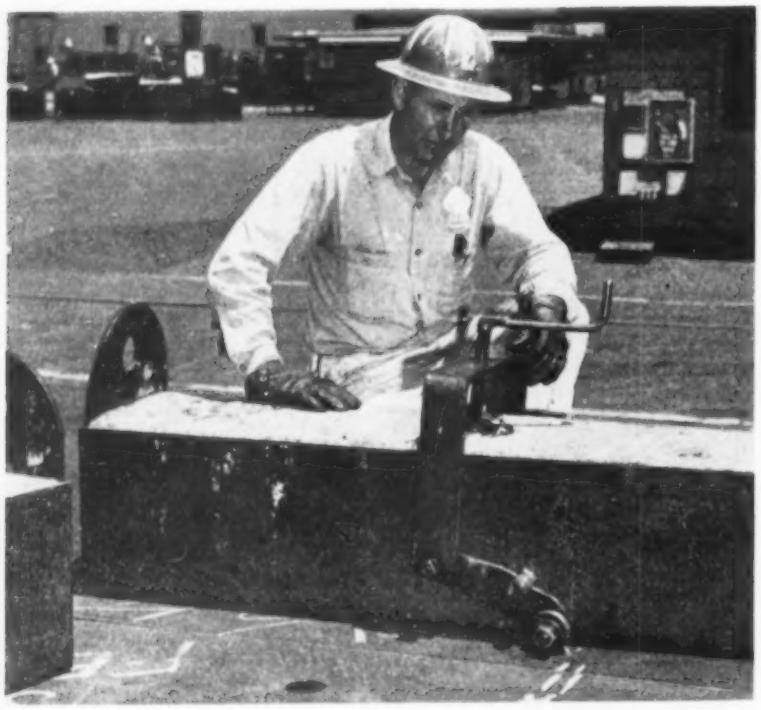
Signal Corps Photo

BRIDGE DEMOLISHED BY GERMANS during retreat in Italy last fall is being replaced with timber trestle by Engineers of Third Division, using crane whose boom protrudes from right of picture

PREFABRICATED MACHINE SHOP ADDITION at Richmond, Calif., shipyards of Permanente Metals Corp., saves estimated 750 to 1,000 man-hours on job. By building addition completely off site, carpenters made it possible for machinists to work right through construction period. New unit is 80x50 ft. and weighs 40 tons.

Fore 'n' Aft Photo

MOBILE METAL RACK permits six welding machines to be moved easily from one location to another at yards of St. Johns River Shipbuilding Co., Jacksonville, Fla. Device designed by H. E. KRESS, welder, won award from company's labor-management committee for ideas promoting efficiency and safety. Hooks on ends of carriage carry coils of electric cable serving each welding machine.

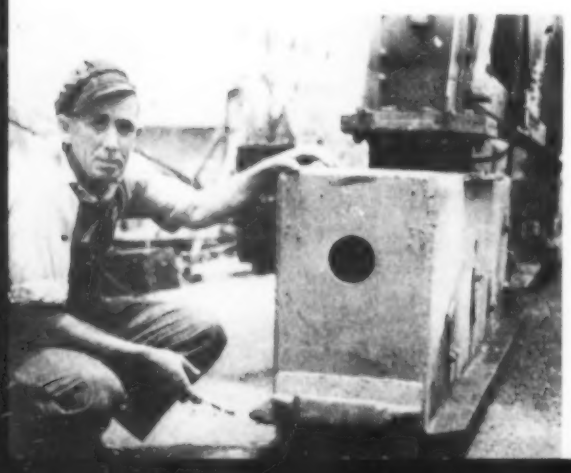


WEIGHT-MOVING DOLLY eliminates need for five-man crane crew and equipment for making several extra lifts, thus saving 315 man-hours per hull at Wilmington, Calif., shipyards of Consolidated Steel Corp., Ltd. Devised by ROY E. NORELIUS, shipfitter subforeman, it is made of flat bar ⅜x3 in. and is U-shaped with movable arms and roller bearing wheels. Stud bolt is welded 3 in. off center of weight. By tightening pressure screw, arm of dolly is pushed against stud, which forces wheels against plate and weight for easy moving. When dolly is placed and pressure screw is turned, weight is lifted ½ to 1 in. off plate. It can then be shoved by one man to desired place and let down.

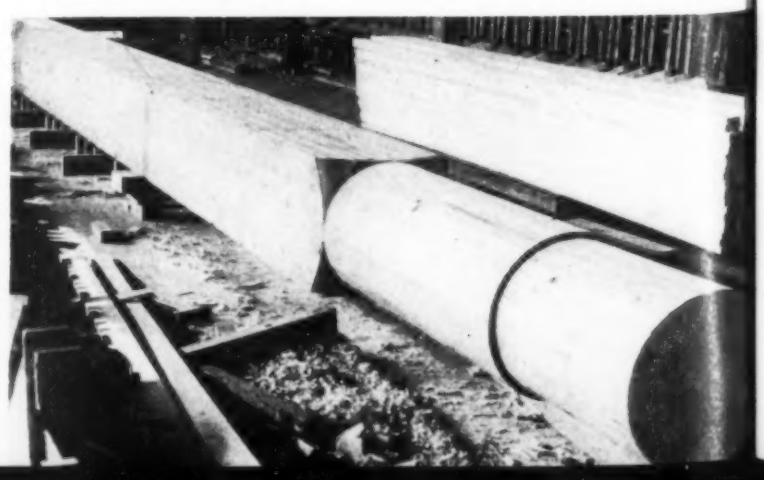
HOW They Did It

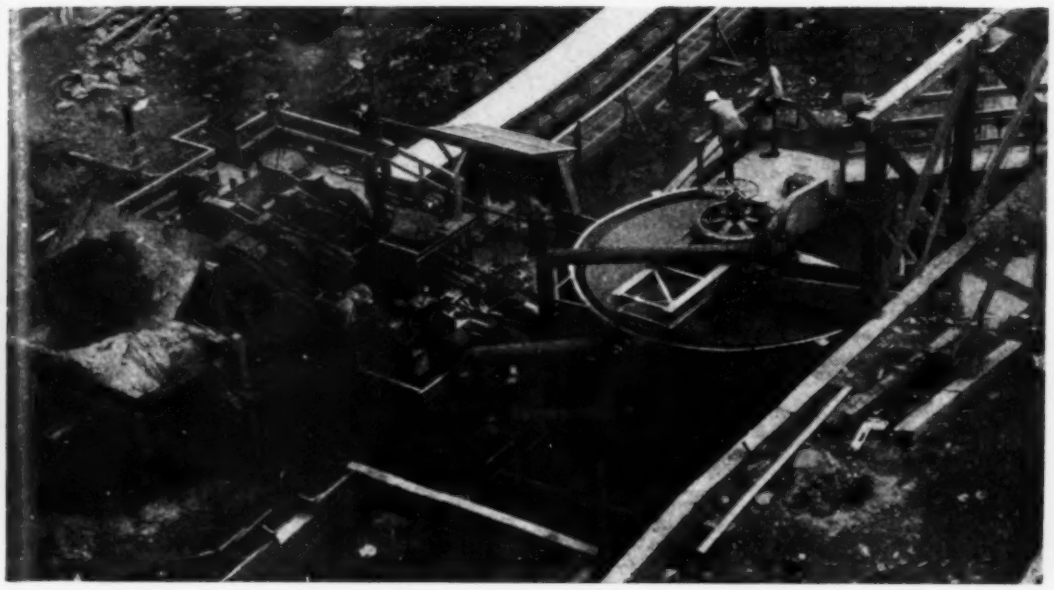
CONSTRUCTION DETAILS For Superintendents and Foremen

HUGE DREDGER SPUD (below) of laminated wood is fabricated by Timber Structures, Inc., of Portland, Ore., for use on Columbia River dredge by General Construction Co. Made of 10,345 fbm. of kiln-dried lumber and 320 lb. of urea cold setting resin glue, spud is 85 ft. long and 30x30 in. in cross-section. Lower end was rounded off by hand tools to fit inside sharp pointed metal sheath which protects wood when anchored in river.

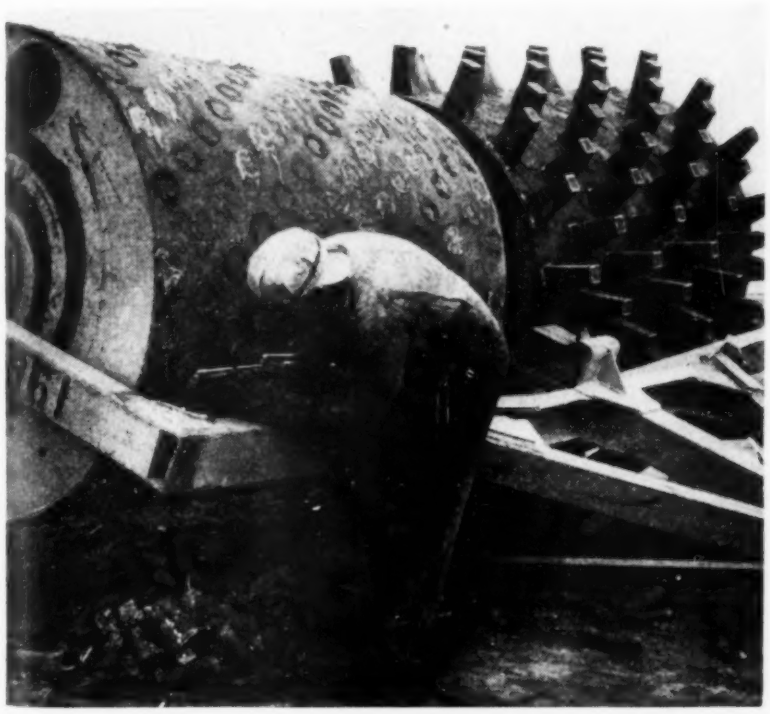


GANTRY CRANE GROUND TRACK (left) is kept clear of grease and dirt by new rail-cleaning device developed by H. J. WINKELSETH of plant engineering and maintenance division, Ingalls Shipbuilding Corp., Pascagoula, Miss. Device is made of scrap metal with heavy web belting as wiper which is flexible and bends in either of two directions in which crane may run. Belting is set in frame with adjustable screws to permit easy changing of wiper.

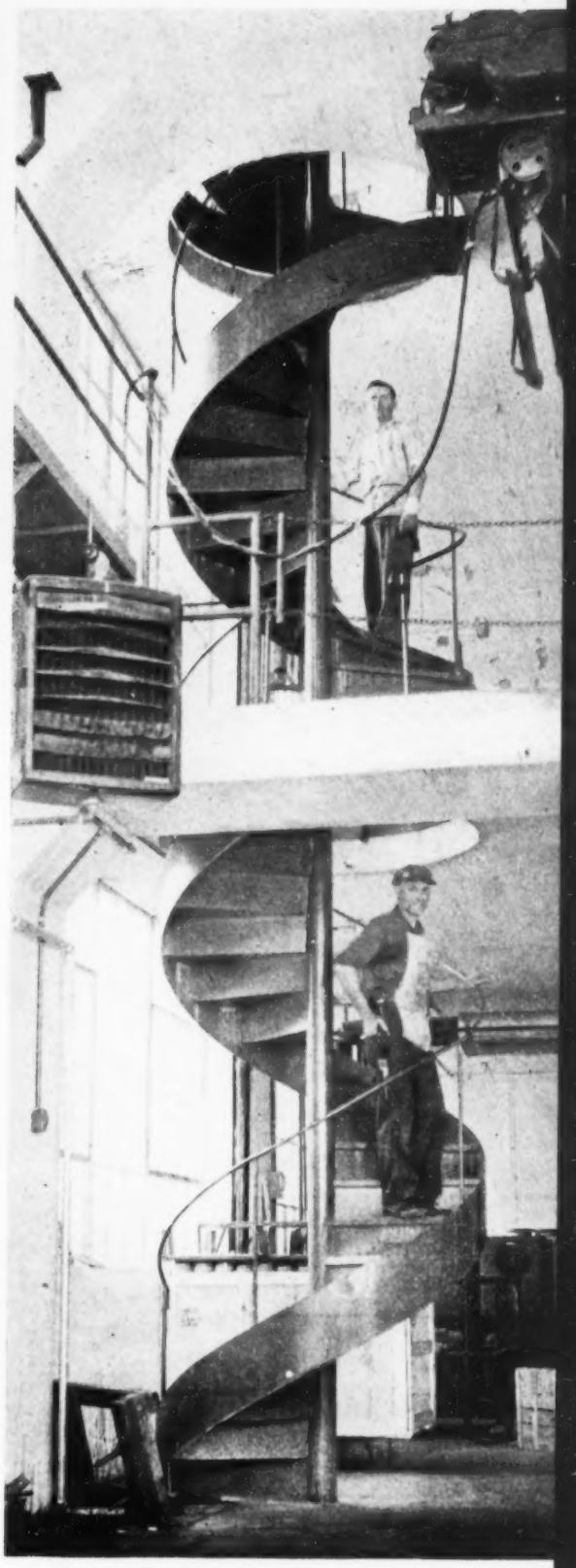




HYDRO-SEPARATOR AND CLASSIFIERS remove about 15 percent waste material, mostly minus 100 mesh, from stone sand product of two rod mills, which have capacity of 240 tons per hour, and classifiers dewater sand to moisture content of 18 percent at Fontana Dam, war power project on Little Tennessee River in North Carolina, where Tennessee Valley Authority produces aggregates and concrete for 2,800,000-yd. structure now being completed on 20-month concreting schedule by TVA forces.



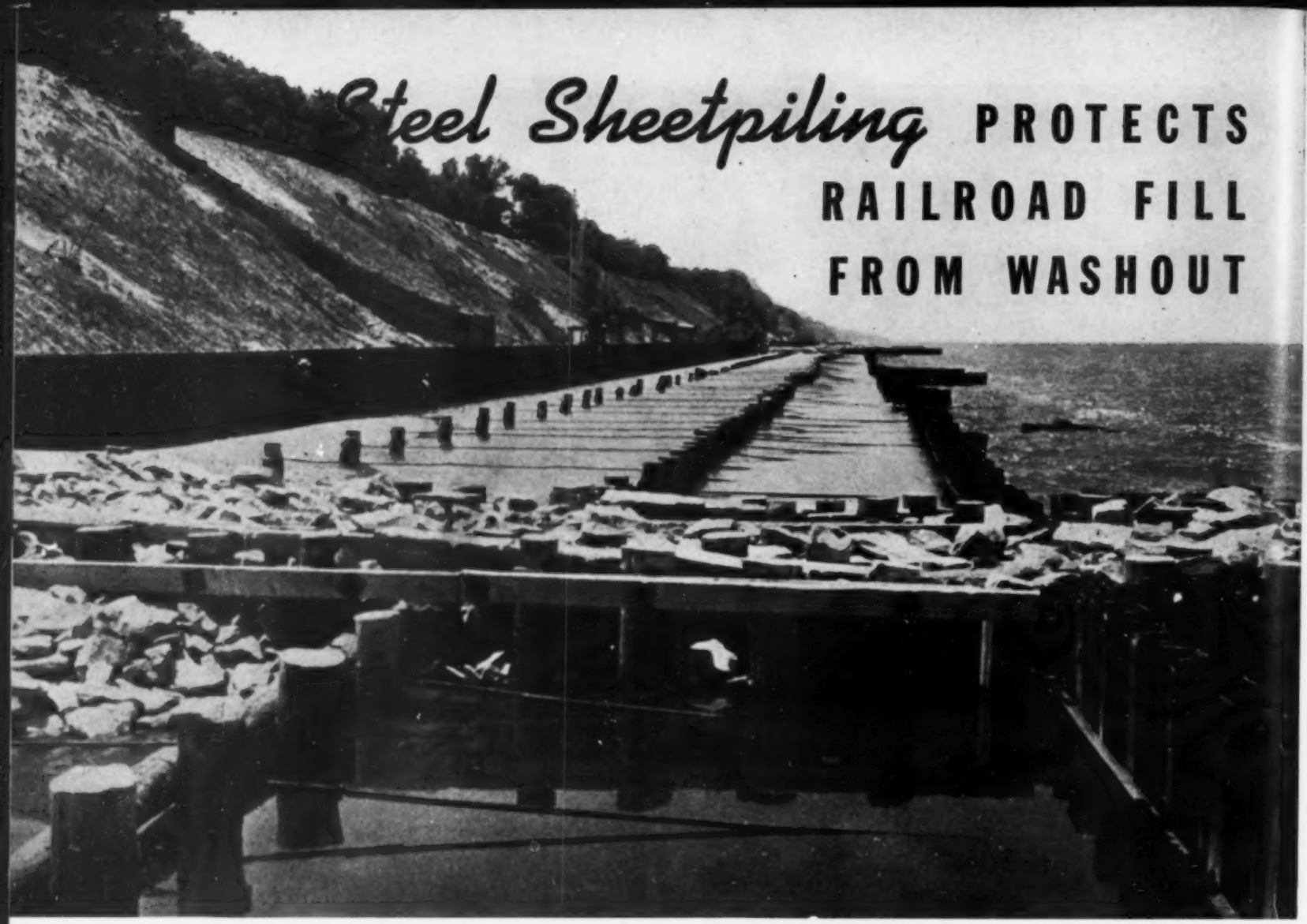
MODERN SHOEMAKER restores sheepsfoot roller by using flame cutting torch to cut off old worn feet, then replaces them with new, larger feet (right) by arc welding. This roller was used to build Hensley Airfield in Texas.
Lincoln Electric Co. Photo



ARC WELDED CIRCULAR STAIRWAY (right) is installed in 6½-ft. space by cutting hole in ceiling, anchoring 6-in. pipe in center and welding one-piece steps and risers to pipe. Steps and risers are formed from single pattern of ⅛-in. plate, welded to pipe, and each riser is welded to step above. For safety and additional reinforcing, 16-gage band is welded to outside of steps and scrap pieces of iron pipe are welded to upriahts for hand rail.
Hobart Brothers Co. Photo

AVIATION ENGINEERS (below) build pier for unloading tanks in Cape Sundest Area, New Guinea. Shovel is Bucyrus-Erie with job-made piledriver attachment.
Signal Corps Photo

Steel Sheetpiling PROTECTS RAILROAD FILL FROM WASHOUT



COMPLETED BREAKWATER is intersected by jetty in foreground. Note spacing of timber piling and 1½-in. tierods from timber piles to channel wale along back of steel sheeting. Corrugated steel sheetpile bulkhead wall with 6 ft. of freeboard protects shore line at left. Timber flumes are in place along slope in background.

IN WAKE OF STORM (below), more than 500 ft. of destroyed track and wrecked car of lumber have to be cleared from right-of-way. Traffic is resumed in 24 hr. by repairing inside track and constructing new track next to hillside. Construction progress on jetties can be seen at upper left.

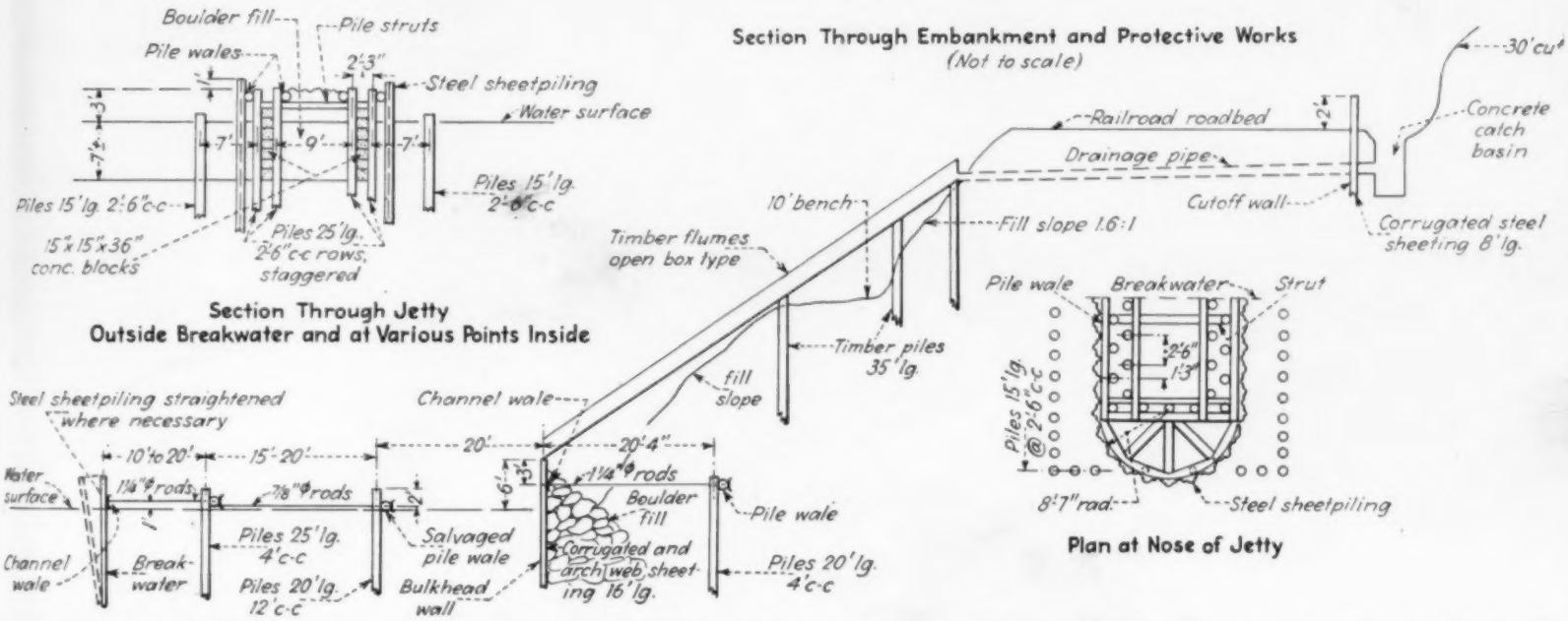
TO PROTECT MAIN LINE EMBANKMENT along a steep hillside cut near St. Joseph, Mich., against washout by heavy rains and undermining by waves from Lake Michigan, the Pere Marquette Ry. has built extensive protective works involving three separate lines of steel sheetpiling, one along the upper side of the railroad roadbed where the tracks run along a bluff 80 ft. above the lake for nearly 2,000 ft., the second at the toe of the slope on the lake shore, and the third out in the lake to serve as a breakwater. Substantial addition to the old fill also has been made, and nine jetties have been installed to aid in protecting the shore line. The project is now being completed by the Jutton-Kelly Co. of Detroit and Milwaukee, contractor for the railroad. Total value of the project is close to $1,500,000.

On the offshore side of the tracks is a line of 8-gage corrugated steel interlocking sheetpiles 8 ft. long, driven to 6-ft. penetration and braced by stiffening ribs every 18 ft. This row of sheeting acts as a cutoff for surface water flowing from the hillside above the tracks. A drainage ditch between the sheetpiling and the bank delivers the runoff into large concrete catchbasins constructed at the head of pipes under the tracks. The pipes discharge into timber flumes which lead down the slope to the beach.

Along the shore at the toe of the em-

RESPONSIBLE FOR FIELD activities on project are (left to right) MERRITT JOHNSON, job office engineer, RALPH SMITH, resident engineer for railroad and DICK EVANS, superintendent of construction for contractor.

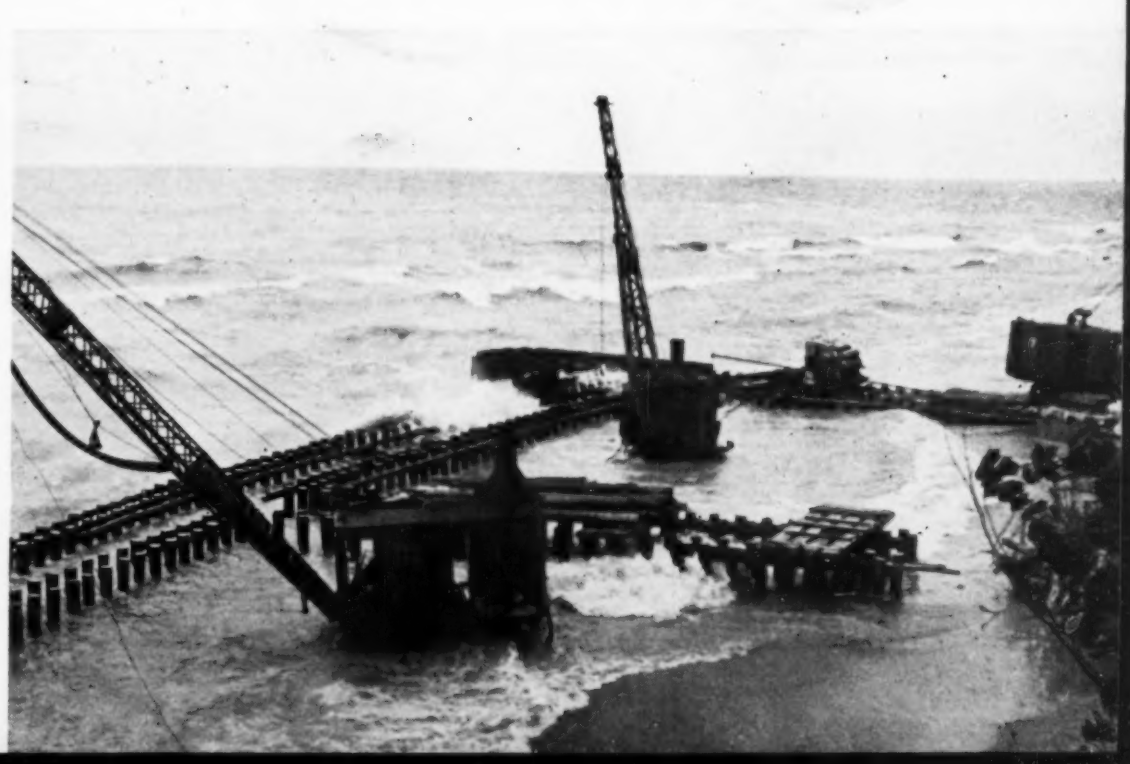
LIGHTWEIGHT CORRUGATED STEEL SHEETING for cutoff wall to protect track from surface water is driven along toe of hillside embankment. Sheeting is standard 8-gage interlocking type, weighing 11.7 lb. per sq. ft. Crew of four men drive 75 to 100 lin. ft. of cutoff wall per day.



RAILROAD EMBANKMENT facing Lake Michigan is protected against storms by steel sheetpile breakwater, bulkhead and jetties. At upper side of tracks, cutoff wall of corrugated steel sheeting and drainage system control hillside runoff to prevent erosion of roadbed.

bankment is a steel sheetpile bulkhead wall 3,000 ft. long made up of about 1,700 ft. of ⅜-in. deep arch web piles and about 1,300 ft. of corrugated sheetpiles. Both types of piles are 16 ft. long, driven to 10-ft. depth, and are anchored by 1¼-in. tierods to 20-ft. creosoted timber anchor piles driven on 4-ft. centers to 15-ft. penetration in a row 20 ft. inshore from the steel sheeting. Behind this sheeting was dumped a fill 5 ft. deep and 8 ft. wide of broken rock to reinforce the bulkhead and provide a base for widened railroad embankment.

At an average distance of 50 ft. outshore, parallel to the beach, a break-



HEAVY WEATHER (right) shuts down timber pile-driving operations by steam cranes on shore wall at extreme south end of job. Double rows of timber piling form pockets for heavy rock riprap. In such weather, work is transferred to upper cutoff wall and flume construction.

DRIVEN TO 6-FT. PENETRATION, corrugated sheetpile cutoff wall allows 2 ft. of freeboard. T sections are welded to back of sheeting as stiffening ribs every 18 ft.

SUPERINTENDENT OF CONSTRUCTION on project, R. L. (Dick) EVANS (above) surveys work along beach construction road. Dick has been with Jutton-Kelly for 10 years.

AT START of original straightening and repair contract in 1942, crews get ready to pull back into vertical position wall of ⅜-in. deep arch web steel

BULKHEAD WALL is backfilled with rock along portion constructed of ⅜-in. steel sheetpiling. Anchor system consists of creosoted timber piling braced with hardwood wales and tied by steel tierods to 10-in. channel wale welded along back of sheetpiling. Toe of embankment fill will rest on rock behind bulkhead.

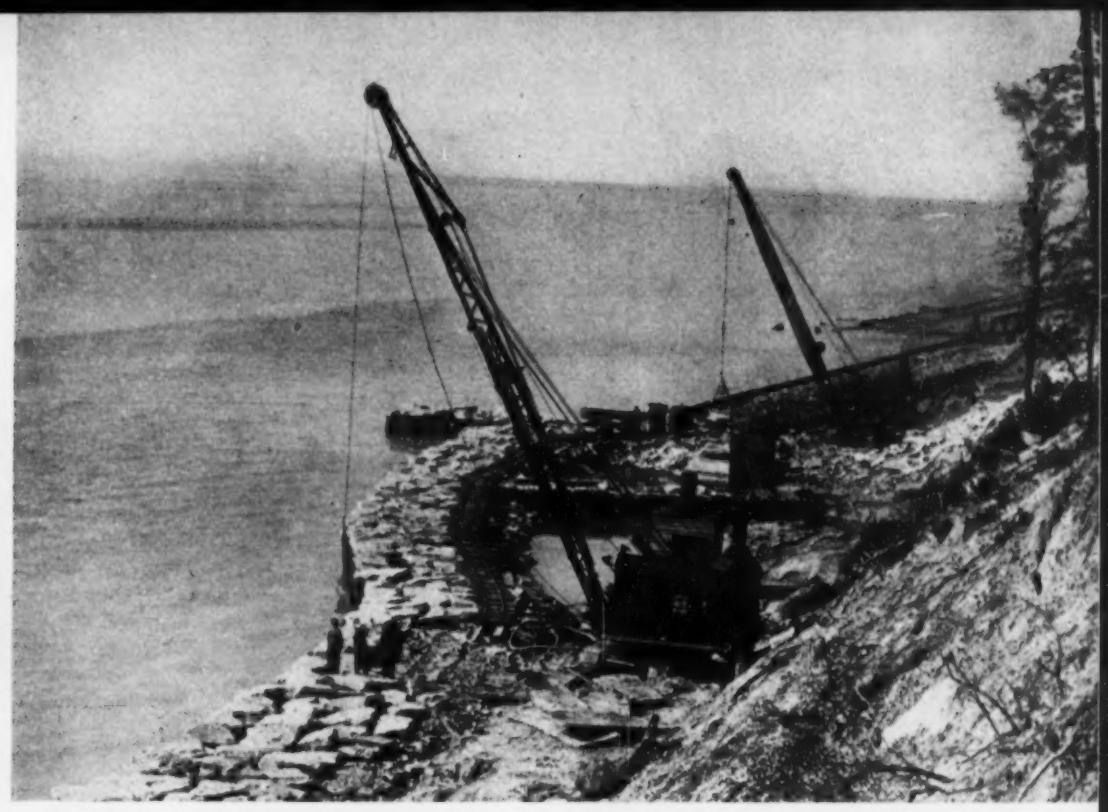
water more than 4,200 ft. long has been constructed of ⅜-in. deep arch web steel sheetpiling 18 ft. long, driven to a depth which leaves 2 ft. of freeboard above the water surface. This line of sheeting is anchored by 1¼-in. steel tierods connecting a channel wale, welded to the back of the sheetpile wall, with a system of timber anchor piles installed between the breakwater and the bulkhead. The anchor system consists of creosoted timber piles 20 and 25 ft. long driven to 15- and 20-ft. depth in two rows an average of 20 ft. apart, parallel to the breakwater and bulkhead, with tierods connecting the two rows.

As further protection to the shoreline, rock-filled steel sheetpile jetties at nine locations extend outward from the breakwater 35 to 45 ft. into the lake. Steel walls armoring this outshore portion of the jetties consist of ⅜-in. deep arch web sheetpiles. Outshore, and at specified points inshore from the breakwater,

DRIVING OPERATION on corrugated steel sheetpile portion of bulkhead wall (below) is performed by steam crane. Guide frame holds piling in place for driving.

TO PICK UP movable flume sections and rock-filled dinkey dump cars, crane (below) functions along beach road. Note precast concrete blocks between double rows of timber piling on each side of jetty in background.

sheetpiling, collapsed outward into lake by severe storm. Sheetpile interlocks have not parted and all torn metal is repaired by welding.



HEAVY RIPRAP CONSTRUCTION nears completion at south end, where 21,000 tons of rock is placed between pile rows to give added protection.

jetty walls to retain the rock fill are constructed of precast concrete blocks laid up between double rows of timber piles.

Contract Enlarged

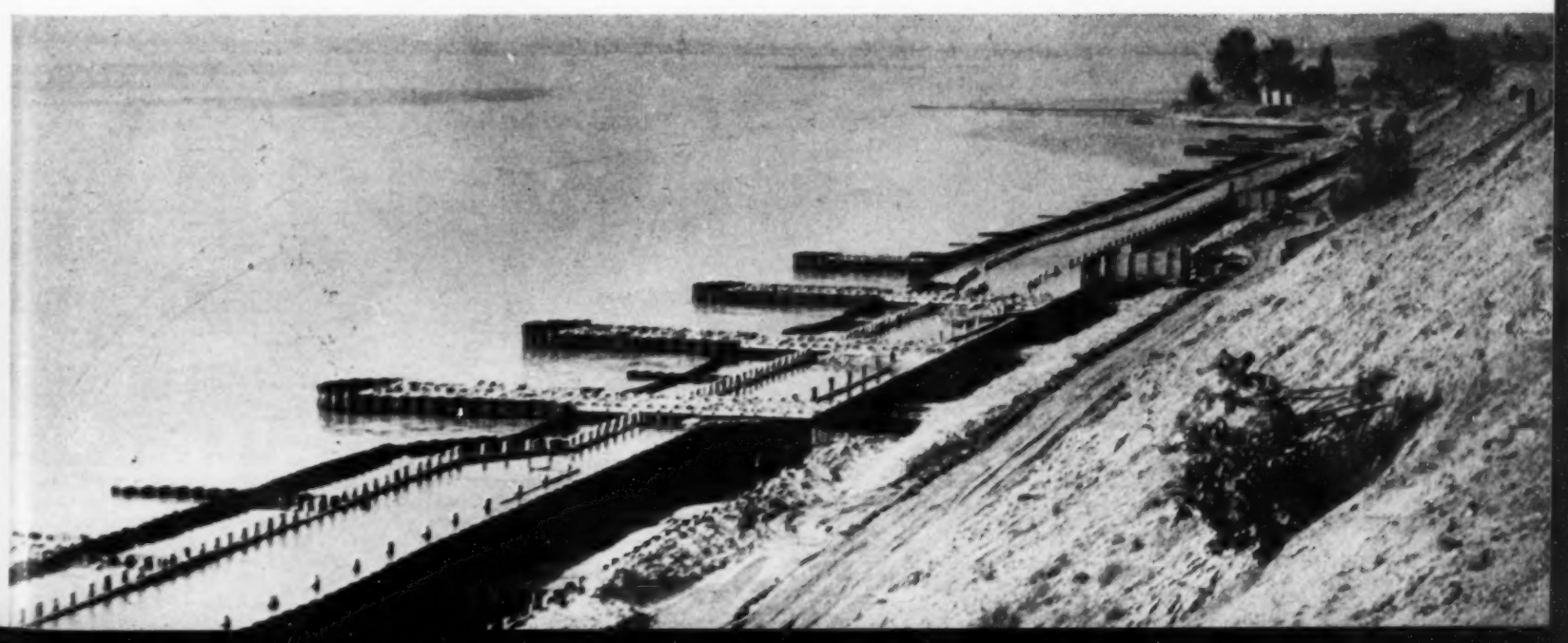
Long aware of the necessity for adequate washout protection along the lake shore for its main line route between Chicago and Detroit, the Pere Marquette in August 1942 let a contract to the Jutton-Kelly Co. to rebuild and reinforce an existing breakwater, 1,550 ft. in length, of ⅜-in. steel deep arch web sheetpiling in front of the 80-ft.-high embankment near St. Joseph. During the course of this work a bad storm occurred early in 1943. For more than two weeks, rising lake waters ate away at the base of the embankment, and surface water from the hillside above rushed across the double-track roadbed. More than 500 ft. of the westbound track, on the lake side of the embankment, was washed out, and three large cave-ins occurred.

At the first washout, the contractor's crew of 42 men, with equipment, was called into action, and a temporary track was laid next to the upper side of the cut. Traffic was halted less than 24 hr.

When the first washout occurred, immediate repair to the fill with new sand and clay material began, and rapid erection of jetties was started at two places where the shore had been washed away

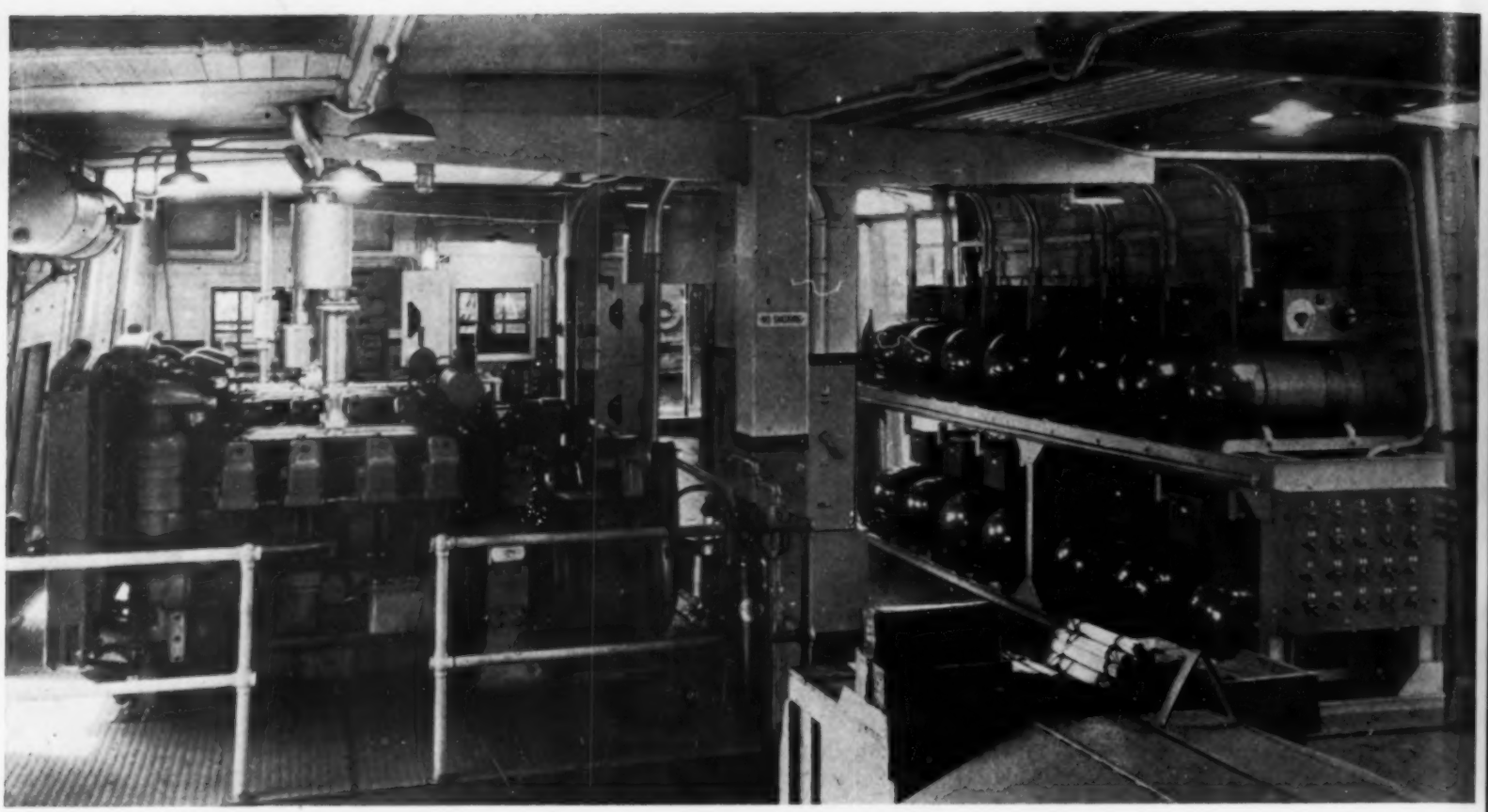
(Continued on page 144)

DRESSING FILL SLOPE, dragline (right) operates 1-yd. bucket. Sand and clay amounting to 120,000 cu. yd. are required to rebuild and extend fill for a length of 3,000 ft.



PROTECTION PROJECT (below) involves steel sheetpile breakwater, bulkhead and jetties. Back of bulkhead wall, with tierod and bin arrangement, is ready for rock fill.

Welding Barge Provides 30 Arcs for Ship



TWO DIESEL-ELECTRIC GENERATOR SETS of 85-kw. capacity supply power to 30 300-amp. electric-motor-driven welding machines mounted in groups on double-tiered steel frames. Note work outlet studs on panel at end of frame for attachment of welding cables.

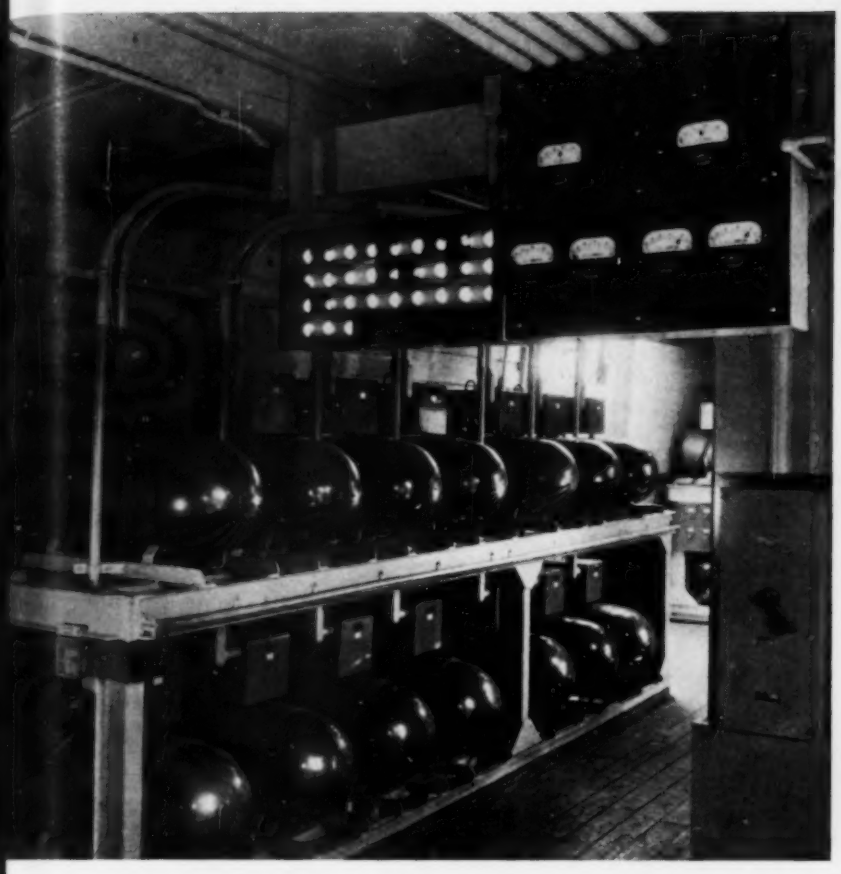
BY ASSEMBLING 30 ELECTRIC-MOTOR-DRIVEN WELDING MACHINES and two diesel-electric generators in a compact layout on a 30x80-ft. barge, the Master Welding Service Co., New York, created a floating unit which can furnish large-scale welding capacity in convenient and flexible form to any job within reach of water-borne equipment. For economy and efficiency, power for the 30 Lincoln 300-amp. welding machines is supplied by two Caterpillar diesel-electric sets, equipped with Allis 85-kw. generators, which can be operated singly or together in accordance with load requirements. The floating unit has demonstrated its usefulness on reconversion and repair welding for the U. S. Navy and Maritime Commission at the Todd Hoboken Shipyards, Hoboken, N. J., where it has replaced many individual gasoline- or diesel-engine-driven welders which formerly occupied valuable pier space.

Water portability, space saving and economical operation are three major advantages of the self-contained welding barge. In addition, it reduces the fire hazard by using diesel

FLOATING WELDING UNIT mounted on 30x80-ft barge ties up between two ships to perform reconversion and repair welding. Electrode cables are run from work outlet studs of banks of welding machines on barge, eliminating necessity of taking up space on piers and ship decks with individual engine-driven welders.

AT DISTANCE of 300 to 500 ft., from floating welding barge, operator deposits weld metal on waterfront job.

...nd Waterfront Jobs

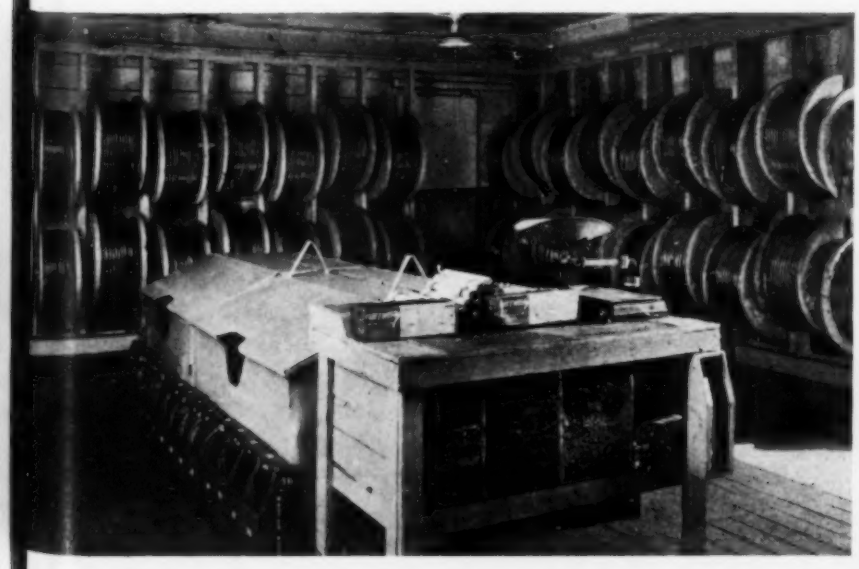


CENTRAL BLINKER PANEL visible from office on barge indicates by lights which welding machines are running and which operators are welding. Bright light shows that machine is operating, and dim light indicates that operator is welding.

fuel exclusively, instead of the more volatile gasoline, and by being able to separate itself quickly from any threatened ship or pier. For jobs where from 15 to 30 arcs may be employed, the welding equipment operates at a low cost for diesel fuel and lubricating oil.

Welding generators on the barge are arranged in three groups on double-tiered steel racks, as indicated by one of the photographs. At the end of each rack is a board containing an out-

(Continued on page 138)



WELDING CABLE is stored on reels in lengths of about 500 ft. Table in foreground is equipped with scales for weighing electrodes and returned stubs, which are returned to stockroom in numbered boxes on floor at left.

OFFICIAL ARMY ENGINEER *News* FROM EUROPEAN THEATER OF OPERATIONS

Nazi Pillbox

In Normandy Becomes Army Engineer Memorial

The first Nazi pillbox captured by U. S. Army Engineers who landed on the Normandy shore 20 min. before H-Hour on D-Day will become the site of a memorial to be erected in honor of the Engineers who died on the beaches. The memorial will be provided by an Engineers' special brigade on the pillbox site where the unit's first headquarters was established just off shore. Until the war's end, when the memorial will be fully completed, the pillbox is being sealed to inclose a plaque engraved with the names of the Engineers who died in the operation.

The Engineers, according to Major General C. R. Moore, Chief Engineer, European Theater of Operations, landed on that beach 20 min. before H-Hour to clear the mines and tear exits through the Nazi obstacles, so that invasion troops following them could command the beach with the minimum of loss of life and delay.

Combat Engineers

Operating Bulldozers in Normandy Wear Flak Suits

Flak suits borrowed from the Air Forces were used on D-Day to protect Army Engineer bulldozer operators on the beaches of Normandy, it was disclosed recently by Major General C. R. Moore, Chief Engineer of the European Theater of Operations for the U. S. Army. The suits afforded a measure of protection against shrapnel and small arms fire as the Engineers launched bulldozer after bulldozer through the surf on the invasion beaches, General Moore said. Shells from heavier German weapons, however, took a heavy toll of the giant Engineer tractor-operated machines.

In many cases, as bulldozer operators became casualties, other Engineers arrayed in Air Force flak suits rushed forward to replace them on the machines. Almost all of the bulldozers used in the initial stages of the invasion operation, General Moore pointed out, were protected by special armor plate, but losses were high.

The bulldozers were used initially to clear lanes through the sandy beaches where landing craft might discharge tanks and vehicles. Other bulldozers plowed through obstacles erected by the Germans, while more of the 23-ton machines cut through the hills beyond the beach, improvising road exits for the waves of disembarking invasion troops who followed.

Oil Pipelines for Invasion Forces

Are Built at 50-Mile-a-Day Rate in France by New Type of Army Engineer Units

Pipelines for the world's largest petroleum distributing system, operated in France by U. S. Army Engineers, are being pushed to the front at a pace which has reached a 50-mile-a-day mark. This news was disclosed in September by Engineers under Major General C. R. Moore, Chief Engineer of the European Theater of Operations, as the race to keep American armored columns supplied with petroleum on the German front gained momentum. Millions of gallons of gas and oil, the Engineers said, are being pumped from the pipeline terminus on the docks at Cherbourg where convoys of tankers rushed from England and the United States are drained on a round-the-clock basis.

Pumping stations scattered throughout France on the

(Continued on page 120)

AVAILABLE
for Essential Civilian Use

While Cletrac is still producing to meet the demands of war with a large part of its standard tractor production required to meet present military contracts, over-all production of Cletracs is sufficiently large so that a substantial number of Cletracs are being released for essential civilian use. These tractors are allocated according to government regulations. Your Cletrac dealer will gladly assist you in making application for a new Cletrac if you can qualify as an essential user.

WHEN postwar *planning* is converted into ACTION, much will depend on the equipment you have for the big jobs ahead. Power and traction will be most important.

For ordinary jobs of earth moving, bulldozing and hauling, any equipment may suffice, but when the going is tough and competition is keen, the advantage is with the contractor who is equipped with Cletrac power and traction.

There is a good reason why the use of the Cletrac Tru-Traction principle of power on both tracks at all times

THE CLEVELAND TRACTOR COMPANY

Write for booklet "In War and Peace Cletracs Do the World's Work"

GASOLINE

CLETRAC *Tru-Trac*

has been applied to all high-speed full tracklaying military vehicles. The effectiveness of this principle (Controlled Differential Steering) has been proved over and over again, in mud and muck, over rocks and hills, the world over. This Tru-Traction principle is exclusively a Cletrac development and used solely in Cletrac Tractors for more than 25 years. It is a principle that will earn dividends for contractors whose profits depend upon power, traction, and economy of operation.

Prepare now for postwar needs. Write today for complete information about Cletrac Tractors, including the new booklet "In War and Peace Cletracs Do the World's Work."

19300 EUCLID AVE., CLEVELAND 17, OHIO

*Tru-Traction is power on BOTH tracks at ALL times—and you get it only with

CLETRAC TRACTORS

Traction **TRACTORS**

DIESEL

RUSSIA

Threat . . . or Promise?

WHEN this war is ended, two nations—the United States and Russia—will possess the bulk of the world's military and industrial might.

Whether this new situation will hold seeds of catastrophe or of unprecedented opportunity will be determined by policies . . . still to be formulated.

If this concentration of power leads to a bitter struggle for supremacy, then the world will be turned into a giant munitions factory.

If it is used cooperatively to maintain order, then, I believe, the stage is set for a long era of prosperity . . . and peace.

It is time that Americans, whether of the Right or the Left, face this basic issue squarely and open-mindedly.

☆ ☆ ☆

No group in this country has a greater stake than have business and industry in seeing that a satisfactory Russian-American understanding is reached.

Without such an understanding there can be no reasonable hope for more than a temporary and insignificant reduction of our crushing wartime tax burden. If the threat of a clash between these two giants impends, neither bankers nor governments will run the risk of lending on a scale adequate to maintain international trade at levels necessary for our future prosperity. Potential international customers, instead of buying freely in open world markets, will be forced—as during the dangerous period introduced by Hitler in the early 1930's—into the trading camp of whichever power they fear most.

If, however, Moscow and Washington will agree on cooperative plans for maintaining the peace, American business will enjoy enormous new trade opportunities after the war.

☆ ☆ ☆

Russia, during the three and one-half years since it was attacked by Hitler, has conclusively proved to a doubting world that it is a top-flight military power.

Soviet railroads did not break down under the strain of war.

Regions accounting for nearly 70 per cent of Stalin's key industries were engulfed by the invading Nazis, but before they fell, Soviet management engineers performed a near miracle by transplanting entire industries a thousand miles to the Urals with the loss of as little as four months' production in many cases.

Though American planes, trucks, and medical supplies have been welcomed by Moscow, fairness demands the admission that more than 98 per cent of American production has *not* gone to the Russian front.

Russian planning and *Russian* equipment won the victories of Leningrad, Stalingrad, and the Caucasus.

☆ ☆ ☆

But these measures of Soviet military strength—indicative as they are of an unsuspected economic development—fail to picture in adequate detail the startling potential of the Russian market after the war.

Russia, for instance, has two and one-half times the area of the United States.

It has a population of nearly 200,000,000, and this is increasing at the rate of 2,500,000 a year.

And statistics just released show that Russia has three times as many youngsters under 16 as has the United States. This is a measure both of war potential and of a vast commercial market.

And remember that in no part of the world before the war was per capita production rising as rapidly as in the Soviet Union.

☆ ☆ ☆

German armies occupied a region in Russia roughly equivalent to the territory in the United States north of Richmond, Virginia, and east of the Mississippi.

This huge area—with its counterparts of Pittsburgh, Buffalo, and Bridgeport; of Illinois corn fields, New York dairy farms, and Maine potato harvests—was *twice* subjected to the most withering destruction; first by the Russians themselves when they retreated before the Germans, and then by the Germans when they withdrew before the victorious Russians.

As a result, 30,000,000 people are in urgent need of complete reoutfitting. They need houses and shoe laces, trolley cars and baby carriages, tractors and livestock, hydroelectric plants and electric light bulbs.

Many of these needs will be met at home. It is doubtful, for instance, if Moscow will import cooking utensils or sewing machines, for many of Russia's huge war factories can quickly be converted to peacetime production of such consumer goods.

But for the rebuilding and expansion of her industries Russia looks to the United States for equipment.

Soviet representatives already are in this country with authority to negotiate for technical men and the equipment necessary to rebuild the great Donbas coal mines according to the most modern American methods.

It is important to remember that Russia's whole iron and steel industry, its non-ferrous mining and processing, some of its chemical production, much of its coke roasting and gas recovery, practically its entire automobile and tractor industry, and the largest of its hydroelectric plants, are based on American machinery and processes.

It is known among manufacturers that Russia recently has asked for bids on shipbuilding equipment, construction and roadbuilding machinery, alloy steels, textile machines, plastics, and a long list of rail, air, and water transport supplies.

☆ ☆ ☆

The Soviet Union, however, has more than a rehabilitation job on its drawing boards.

The first Five-Year Plan, which, as we all remember, was completed ahead of time in 1932, was devoted almost exclusively to heavy industry. Russia set out to build for itself the machines and the factories which, in later years, could turn out, at home, modern equipment for a vast range of light industries.

Stalin, when he inaugurated the second of his famous Five-Year Plans, promised that before it was completed Soviet factories would begin to turn out a flow of con-

sumer goods—ready-made dresses, canned foods, soap, cosmetics, shoes, kitchenware, automobiles, telephones, and modern houses.

But, by 1935, Moscow realized that Russia could not afford to enjoy such luxuries in the face of growing political tension in Europe. So, when the third Five-Year Plan was launched, there was no fanfare. Russians continued to wear their old clothes, to eat whatever simple food was available, and began grimly to build the industries which ultimately produced enough tanks, planes, and guns to turn the tide of battle at Stalingrad.

It is characteristic of Moscow that even before the last battles with the Nazis are over, Russia is planning to pick up its Five-Year Plans where the war had interrupted them.

Invitations to participate in a permanent exhibition in Moscow already have been mailed to American manufacturers. Soviet officials want their public to see samples of our new machine tools, aluminum and alloy products, oil-drilling machinery, bulldozers, and prefabricated kitchen equipment. Russia already is projecting specific plans to resume the job (1) of making the country an industrial giant comparable to the United States, and (2) of making life more pleasant for a long-suffering people.

☆ ☆ ☆

What is the measure of this postwar market in the Soviet Union?

Some estimates place the total quantity of goods which Russia might take from the United States during the first two or three years after the war as high as $5,000,000,000 a year. Then, as Russian industry is restored, imports from the United States might taper off perhaps to $2,000,000,000 a year.

Actually, these estimates are far too optimistic, unless the United States is prepared (1) to help Russia pay by buying vast quantities of Soviet raw materials, and (2) to provide large credits to handle the purchases during the first few years of rehabilitation.

The relations of American exporters with Russia during the period covered by the three Five-Year Plans have been eminently satisfactory. Moscow has met all of its obligations punctually; fifteen years of experience have reduced contract forms to the point where they cause a minimum of misunderstanding between the Russian representatives and the American producers; individual American companies with extensive prewar experience in handling Soviet business already are offering large credits on initial postwar orders though these may yet be replaced by large government credits at lower interest rates.

But the volume of trade with Russia after the war hinges upon Moscow's ability to pay. Never before the war did the United States buy more than $30,000,000 of goods a year from Russia. As late as 1938, Soviet exports to this country amounted to as little as $23,500,000, far less than enough to pay even the service charges on the credits which would have to be extended in connection with exports of several billion dollars a year. Only South Africa produces more new gold each year than the Soviet Union. But the United States does not want gold; more of it would only complicate the problem of controlling prices here.

If the United States, however, is to achieve, after the war, the high level of national income which is necessary (1) to keep our expanded factories in operation, and (2) to service the national debt, it might absorb from $90,000,000 to $100,000,000 a year of the kind of goods bought from Russia before the war—furs, timber, manganese, chromium, and handicrafts. But unless this volume of purchases from Russia can be boosted by another $50,000,000 annually, credits of the size necessary to fill immediate Russian needs could not be serviced without large supplemental importations of undesirable gold.

The nub of the situation is that Russia offers an extraordinary potential market particularly for our heavy industries which have grown so enormously during the war. But if this sales outlet is to materialize, then the United States must find a way to import from Russia (or from Russia's debtors if any) from ten to twenty times as much as we did before the war. Instead of merely going after the export business, American businessmen must explore with the Russians the possibility of buying bigger supplies of Soviet products.

☆ ☆ ☆

But more than the Russian market itself hinges upon sound cooperative action by the world's two leading military-industrial nations.

If trade between them is held to a minimum and if relations are strained, the flow of trade all over the world will be adversely affected.

Europe, long this country's biggest export outlet, certainly will never take the bold steps necessary to reconstitute its economy on a peacetime basis if Russia and the United States drift into a race for military supremacy.

The Balkan states, which may be industrialized by Moscow in order to reduce their dependence on Germany, and the Arab world with its huge need for transportation, irrigation, and sanitation, will not dare accept American credits or make big contracts with American engineers if Moscow frowns on the deals.

And refusal of Russia and the United States to work cooperatively to maintain the peace would kill, in their present embryonic stage, all dreams of a vast industrialization program for China.

☆ ☆ ☆

The opportunity to make a major change in the trade map of the world and at the same time to achieve a sharp rise in our own standard of living is before us.

It demands of American business leaders the kind of boldness and imagination that their predecessors displayed when they pioneered this country's unknown West.

It demands realistic action by men who know that the solution to this country's *real* foreign trade problem under today's conditions lies in boosting *imports* not exports alone . . . men who are not afraid of being paid for what they sell.

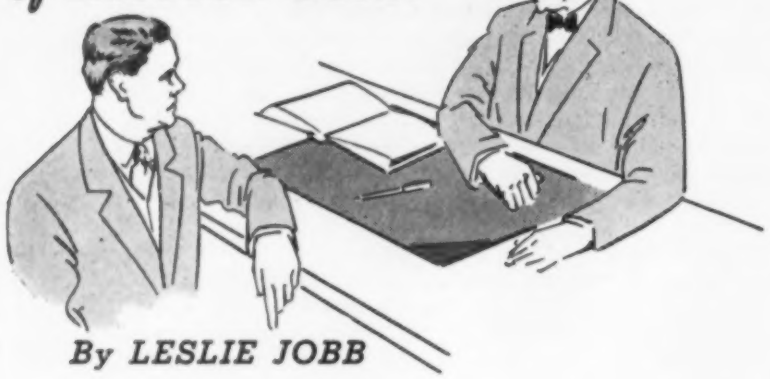
It calls for leaders who will approach Moscow and other major customers at once with constructive plans that would parallel in scope those on which this country is waging war . . . leaders who will make it clear at the outset that this bid for cooperative action emphatically demands that each nation shall have complete freedom to determine its internal political and economic organization without interference from the other.

It is *this* caliber of leadership upon which our future hinges.

President McGraw-Hill Publishing Company, Inc.

THIS IS THE 29TH OF A SERIES

LEGAL ADVENTURES of TRACTOR CONN

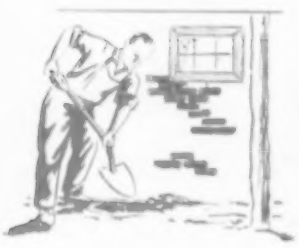


By LESLIE JOBB

No contractor ever tries to be his own dentist or his own shoemaker. It is even more dangerous for him to be his own lawyer. There are, however, some legal rules which every contractor should know, and these rules may be explained in plain English without resorting to the jargon of the law, unintelligible to most laymen.

This series of articles, dealing with the Legal Adventures of Tractor Conn, a typical contractor anywhere in the United States, explains some of these legal points in plain language for the contractor. Each one is based on an actual decision of an American Court.

The Case of the Tardy Garnishee



"Tom Brown has a job to dig a cellar and put in a concrete wall for Roy Rigby and Rigby's to pay him $700 for the job. Brown's completed the work, but Rigby hasn't paid him over the cash yet," the town encyclopedia announced.

"Brown has owed me $600 nearly long enough for it to be outlawed," Tractor Conn averred and sought out his attorney.

"We'll make out the proper papers, get a garnishee order, and serve it on Rigby before he pays the money over to Brown," the lawyer explained.

"Go ahead and I'll pay the bills."

Inside of an hour the garnishee order was ready. Conn and his lawyer went to Rigby's office where the order was duly served.

"I'm sorry," Rigby explained, "but I sent him a check yesterday for every cent that was coming to him."

"Why can't we get Mr. Rigby to stop payment of the check at the bank, and go ahead and garnishee the money just the same?" Tractor Conn questioned.

"It's no go," the attorney explained. "The law is well established that if Doe owes Roe and Poe owes Doe, and pays Doe by a check before Roe's garnishee order is served on Poe, the check operates as a payment and the garnishee order is of no effect, even though the check is not paid at the time the garnishee is served."

"Well, I'm stung again, but you made a good try," Tractor Conn told him.

The Case of the Early Bird

A dilatory debtor gave Tractor Conn a check for an account that would have been outlawed in a few months.

"The Contract Bank opens at 10 o'clock, the paying teller's around by 9:30, and they will always let me in the side door," Conn mused. At 9:45 the next morning he left the bank with his money in his pocket.

At 5 minutes to 10 the maker of the Conn check served a stop pay order on the bank and the bank reported to Conn.

"I've got my money, so you and your customer will have to fight it out between you," Conn stated. The debtor sued the bank in the Washington courts and lost, on the ground that where there is no statute law to the contrary a bank may, if it wishes, pay a check before the regular hour fixed for the opening of the bank.

In a New York case along the same line, there was no statute law on the point, but a certain bank had passed a bylaw fixing an hour for the opening of the bank. Notwithstanding this bylaw, the New York court ruled that the bank was justified in paying a check before the regular hour.

The Case of the Useless Telegram

Tractor Conn pushed the proffered check across the desk. "Cash or the equivalent," was Conn's ultimatum.

"Wire the bank and ask if they have funds to pay it," the customer suggested. Conn did so.

"We have funds," the bank wired back immediately upon receipt of Conn's inquiry.

"Why not ask the bank to confirm their telegram," the bookkeeper suggested. "Wire them saying 'Confirm your wire you have funds cover check.' "

"That is a good idea," Conn agreed and acted thereon.

"This will confirm our wire we have funds pay check," the bank telegraphed. However, when the check came back 6 days later it was stamped "No funds."

"I have the telegrams, so I'm safe," Conn assured himself.

"These telegrams of the bank simply imparted the information that the balance of the drawer was sufficient to meet the check and did not import an acceptance of the check or promise to pay it. They seem to have been carefully worded for guarding against acceptance or promise to pay," said the State Court in deciding that Conn had no case.

The general rule in the American courts is that a telegram saying, "We will pay John Brown's check for $100," binds the bank to do so; but if the bank merely wires, "John Brown's check is good" or "We have funds to pay John Brown's check," it does not bind the bank if Brown withdraws the necessary funds before the check arrives. The bank merely says the check *is* good at that moment and does not guarantee that it *will* be good at any future time.

More Legal Adventures of Tractor Conn Next Month

What makes this Upson-Walton Cargo Hoister a Better Cargo Hoister?

UPSON-WALTON have manufactured cargo hoisters for more than a quarter of a century. They were good cargo hoisters—but they could never compare with the cargo hoisters we have just perfected, after over a year of the most intensive engineering research and development.

Today's Upson-Walton cargo hoister is a *better* cargo hoister —*better* in many ways. You can depend on it to give *better* service under actual operating conditions because:

TIMKEN ROLLER BEARINGS ARE SEALED IN—operators cannot tamper with them and throw the bearing out of adjustment.

REINFORCING RIBS ARE INSIDE, PROTECTED—they can't be knocked off on the job, thereby weakening the block. Smooth surface of block prevents snagging or catching on obstacles.

SPECIAL ANALYSIS STEEL SHELL—gives greater ultimate strength and toughness. The quality of the steel used makes it possible to get a better casting surface; casting is free from weakening pits and inclusions.

ALL SHELLS ARE HEAT TREATED—to relieve internal stresses. Strength is uniform throughout; there are no weaknesses, hence the block itself is stronger.

ALL CONNECTIONS ARE DROP FORGED FINE GRAIN STEEL—this results in a greater toughness and strength. Every shackle and swivel eye is as strong as the block itself. Here again—no weak parts to weaken performance.

EXTRA HEAVY STEEL SHEAVES—recessed in the shell plate so that rope runs freely always.

AS WE GO TO PRESS, DELIVERIES ARE GOOD

U-W

ESTABLISHED 1871

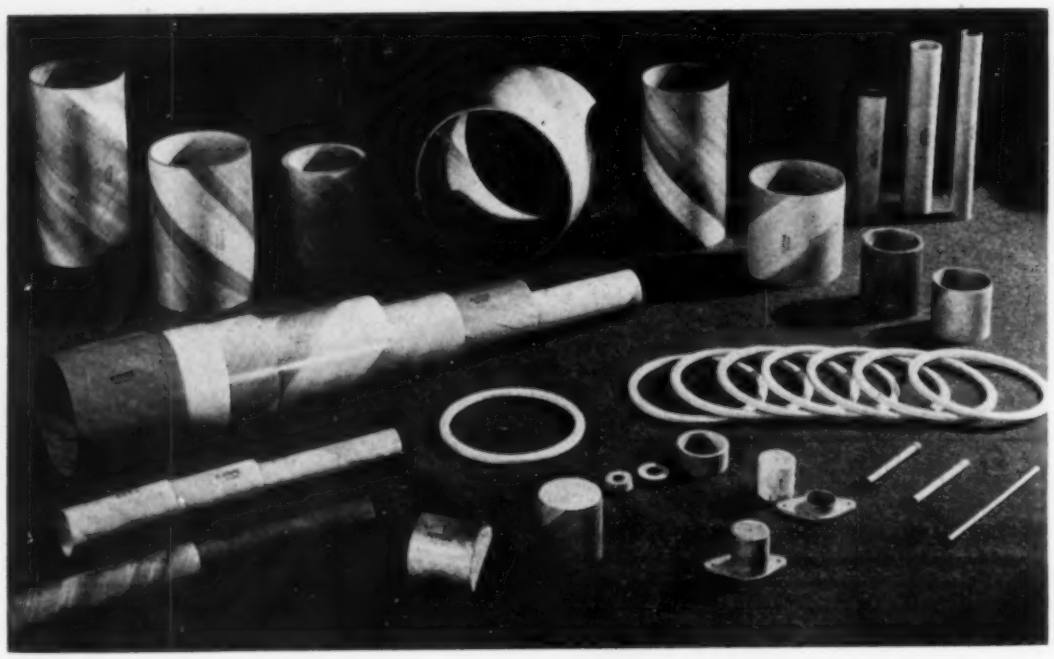
THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

NEW YORK • PITTSBURGH • CLEVELAND • BUFFALO • CHICAGO

CONSTRUCTION EQUIPMENT NEWS

NOVEMBER, 1944 REVIEW of Construction Machinery and Materials



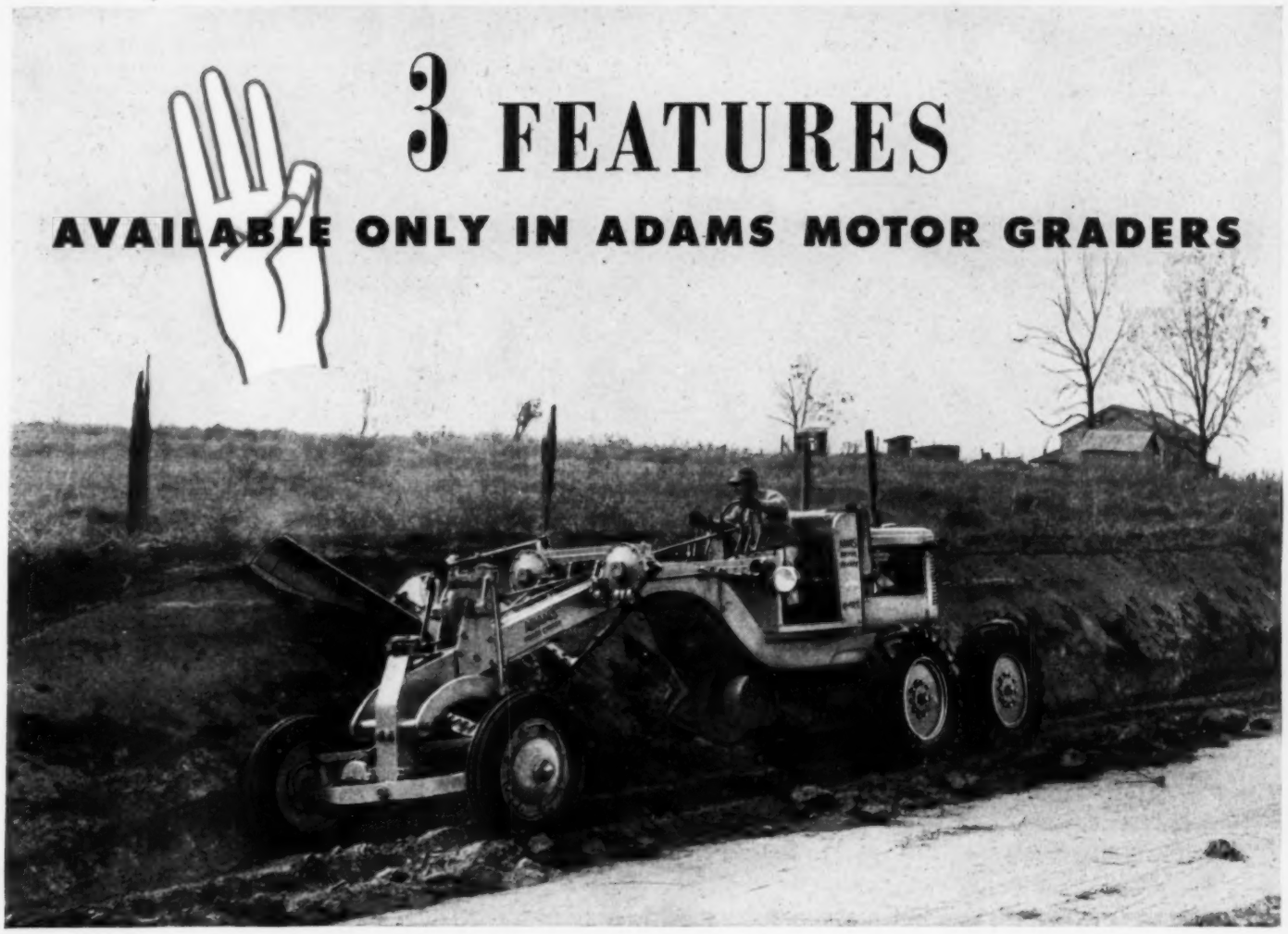
PLYWOOD TUBING, named Plytube, fabricated from thin veneers and a thermo-setting synthetic resin is now available to replace critical war materials, wherever weight is a factor, in construction of sectional life-raft oars, demolition floats, motor shafts, radio antenna masts up to 90 ft. in height, telescoping tent poles, ship railings, camouflage netting poles, signal masts, oil reservoirs and many other structures of this type. Manufactured at present with inside diameters from ½ to 18 in.; in wall thicknesses from .05 to .50 in., and in any reasonable length. Light enough to float in water, Plytube is claimed to have strength to carry much heavier load than steel tubing same weight. Because of its plastic bonding agent, Plytube is waterproof, flame-proof, splinter-proof and rot-proof. It has low electrical conductivity and is dimensionally stable under extreme temperature ranges which do not affect thermosetting adhesive, making it suitable for use in sub-zero weather where metal would be injurious to the touch. Plytube, when coated, may be employed to carry chemicals and to make gasoline and oil containers and for constructing conduit. May be threaded on job with ordinary pipe dies and cut with regular woodworking machinery. For straight tubing in quantity schedules permit 30-day delivery.—**Plymold Corp., Lawrence, Mass.**

★ ★ ★

THREE NEW PAPER PRODUCTS now available for use in construction field are: (1) Concrete plasticized curing paper known as "Skufpruf," which insures qualities of unusual toughness, less shrinkage and "high wet strength;" (2) road-curing blanket produced in 10-ft. widths instead of the usual 7-ft. size, making possible easier handling, saving of time and money, reduction by 25 percent labor involved in sealing laps and provision for smoother rolling blanket unit in field; (3) prolonging service of concrete curing blankets is made possible by "stringer sheet," an 18-in. by 60-ft. strip of paper which eliminates that part of blanket which overhangs slab and which ordinarily deteriorates and tears long before service of main blanket is fully utilized. Another advantage of stringer is time saved during form removal when flopping paper must be covered with earth. Stringer is rolled with main blanket at factory and when unrolling is done, it extends along outer edge between pavement and blanket. After forms have been stripped, stringer is turned down along side of slab and held with earth.—**Richkraft Co., Builders Bldg., Chicago 1, Ill.**

3 FEATURES

AVAILABLE ONLY IN ADAMS MOTOR GRADERS



PROBABLY no one motor grader on the market has an important operating feature which cannot be found in some other motor grader but that doesn't mean that all motor graders are alike or of equal value. Only in Adams do you get the combination of the three operating advantages described below which are preferred by most experienced operators:

❶ 8 Forward Speeds . . . High Transport Speed

Wide working range permits operator to select exact speed to make each cut at fastest practicable rate. Result—more work done per day . . . Transport speeds run as high as 21 mph.

❷ Accurate, Dependable, Mechanical Controls

Not only operate easily and quickly but, because they always operate at uniform speed, provide more accurate adjustments than do hydraulic controls. Two adjustments can be made at same time without affecting speed of either.

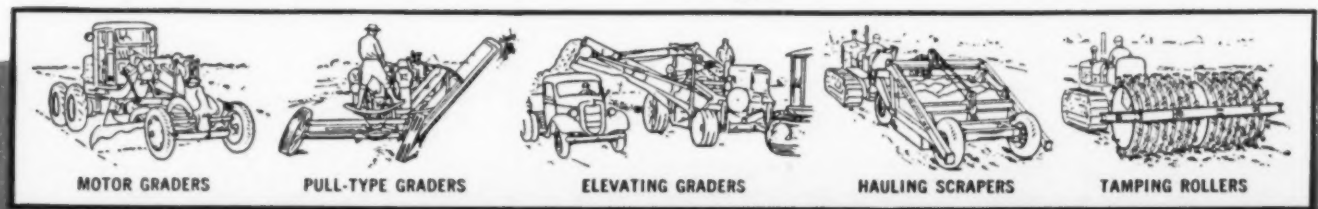
❸ Push-Button Starting From Operator's Cab

Electrically-equipped Adams machines are started as easily as your automobile in any kind of weather. Saves time and tempers on cold mornings.

In addition to these features, you get Strength and Durability . . . Well-Balanced Weight Distribution . . . Adequate Power and Traction . . . Adaptability to a Wide Range of Jobs . . . Economical Operation and "near-by" Adams Service wherever you go . . . See your local Adams dealer now about your post war requirements.

J. D. ADAMS COMPANY • INDIANAPOLIS, IND.

At war's end we'll need many new roads and many jobs for returning service men. Plan post war projects now and meet both needs.

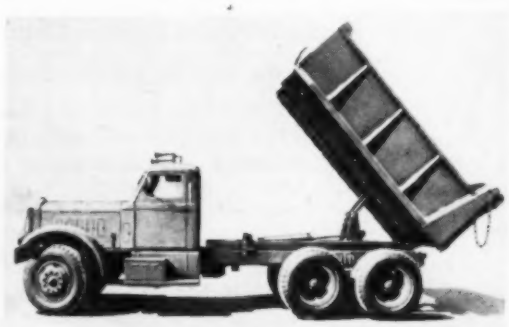


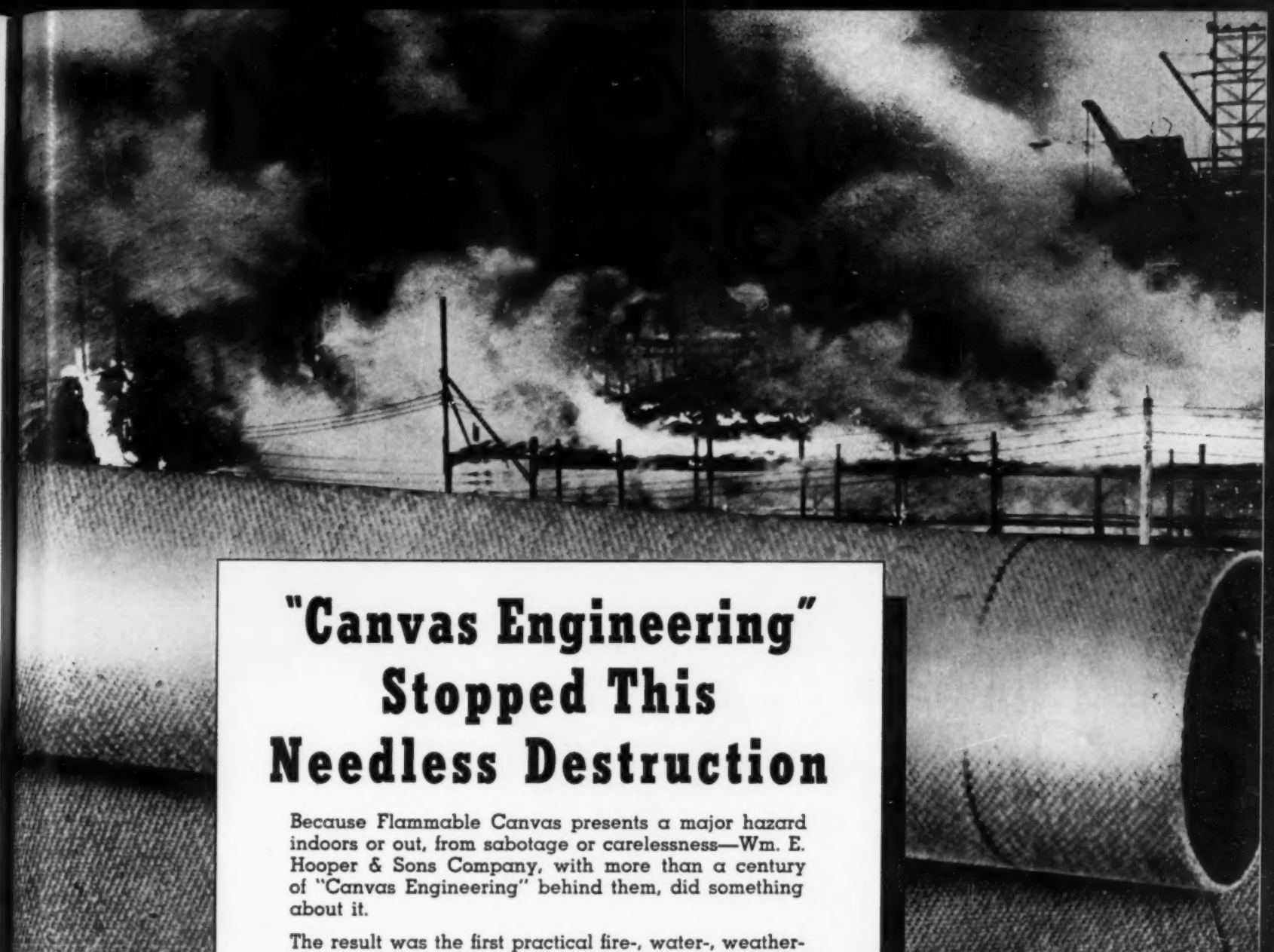
ADAMS ☆ ROAD-BUILDING AND ☆ EARTH-MOVING EQUIPMENT

ELECTRIC PORTABLE POWER GREASE GUN has been developed to deliver fast, positive high pressure lubrication with all types of lubricants that seek their own level. Equipped with large, heavy-duty wheels for easy mobility, operation is further facilitated by a ball-bearing front caster in steering mechanism. Driving device connects heavy-duty 1/3-hp. electric motor to a high pressure grease piston and cylinder made of specially treated and hardened steel and fitted to close limits to prevent bypassing. Mercury switch automatically shuts off motor when 5,000 lb. of pressure have been built up in delivery hose. Gun has easily accessible check and pressure release valves. Equipment includes 12-ft. electric cord, 6-ft., ¼-in. 20,000-lb. burst pressure hose and control valve with hydraulic coupling, combination handle, cord and hose rack. Gun is 28½ in. high, 15 in. wide and 26 in. long.—**Alemite Div., Stewart-Warner Corp., 1828 W. Diversey, Chicago, Ill.**

★ ★ ★

TWIN-ARM HOISTS suitable for all makes of trucks and trailers and all styles of bodies are capable of lifting loads of 24 tons to a 50-deg. angle in 10 or 15 sec. Operation is said to be smooth and noiseless, and body can be stopped and held at an angle without undue strain on hoist mechanism. Loads may be dumped efficiently even when truck chassis frame is twisted because of uneven ground. New hoists have been simplified and save more than 300 lb. of dead weight on an 1,800-lb. unit. They are completely fabricated and welded, require no heavy castings, eliminate many rollers, cams and gears and permit operators to carry a greater payload on each trip.—**The Heil Co., 3000 W. Montana St., Milwaukee 1, Wis.**





"Canvas Engineering" Stopped This Needless Destruction

Because Flammable Canvas presents a major hazard indoors or out, from sabotage or carelessness—Wm. E. Hooper & Sons Company, with more than a century of "Canvas Engineering" behind them, did something about it.

The result was the first practical fire-, water-, weather- and mildew-resistant canvas — FIRECHIEF FINISHED HOOPERWOOD DUCK, widely used throughout industry and now serving every branch of Uncle Sam's armed forces. (Many millions of yards meeting all government specifications.) The culmination of years of research and development—the success of this phenomenal material lies not in the finish alone but in the construction of the canvas itself, so woven to insure maximum working strength, thorough penetration of the finish, and freedom from irregularities which would impair efficiency in service.

Matching individual needs with the particular canvas construction best suited to the job has been a Hooper tradition since 1800. Today, our entire production is mobilized for Victory. But when business returns to normal, this sound "Canvas Engineering" will mean much to Industry in extending the usefulness of Cotton Duck.

WM. E. HOOPER & SONS CO.

New York PHILADELPHIA Chicago

Mills: WOODBERRY, BALTIMORE, MD.

Since 1800 (through six wars) the HOOPER name has symbolized highest quality in Cotton Duck and other Heavy Cotton Fabrics, Paper Mill Dryer Felts, Filter Cloth, Rope and Sash Cord

HOOPERWOOD REG. U.S. PAT. OFF. DUCK BALTIMORE

HOOPERWOOD COTTON DUCK

MOBILE CRANE, ¾-yd. capacity, is one-man-operated machine mounted on a three-axle undercarriage. From operator's position in cab he controls not only functions of crane operation, but also

traveling of undercarriage. Travel brakes are operated by air; steering by hydraulics. Equipped with four-speed transmission, giving range of speeds from 1 to 8 mph.—**Universal Unit Machinery Corp., Milwaukee 1, Wis.**

★ ★ ★

CLEANING SYSTEM FOR GOGGLES AND LENSES consists of (1) Hermetically sealed ampoules of "Brite-Ize" concentrate, each of which when mixed with distilled water makes a gallon of lens cleaner, and (2) Brite-Ize cleaning station dispensers. Brite-Ize is specially compounded detergent for removing fog, grease, grime and splat-

ter instantly, leaving no halation and claimed not to injure rim plating, leather, fabric or rubber mountings. By making lens cleaning easy, it encourages workmen to keep goggles clean with resulting improvement in work, reduction in accidents and elimination of eye-strain and ensuing fatigue. Concentrated form simplifies shipping, handling and storing problems and reduces costs —allowing a liberal ¼cc. per lens, 60 lenses or 30 pair of goggles can be cleaned at a cost of about 1c. Dispensers are of pressure type charged with air either from any standard, 50-lb. air line or with a small hand pump. At touch of lever Brite-Ize is released in fine mist spray.—**The Brite-Ize Co., 1218 Pratt Blvd., Chicago 26, Ill.**

This is *One* of 896 MOTO-CRANE JOBS

Since Moto-Crane Service, Inc., Detroit, started in 1940, they've completed 896 separate jobs covering every phase of material handling, excavating and rigging.

Some jobs lasted only a few hours, others up to 17 months; one was 240 miles from Detroit. To handle the steadily increasing demand for Moto-Crane service, this organization has built up a fleet of 6 Lorain Moto-Cranes.

Similar reports from hundreds of other Moto-Crane owners—Service Companies, Contractors, Steel Erectors, Industrials — are further proof that Moto-Crane *mobility, speed-in-transit and ready convertibility to* Shovel, Crane, Dragline and Clamshell provide the profitable answer to many postwar excavating and material handling problems.

Quick Facts About the Moto-Crane

THE CRANE

1. Simplified Center Drive direct-to-the-point power application.
2. Balanced turntable design, to provide the greatest capacities per pound of weight.
3. Steel erector's precision boom hoist with positive power control of boom lowering.
4. 2-piece, pin-connected all-welded boom with center sections and straight or gooseneck tips.
5. Cab type tagline which functions efficiently at all boom angles and digging depths.
6. Convertible to Crane, Shovel, Dragline, and Clamshell.

THE CARRIER

1. 3-axle mounting on 10 rubber tires. Both tandem rear axles drive.
2. High speed transmission range for road travel — low range for off-the-road travel.
3. Close-coupled, 175" wheelbase for better maneuvering.
4. Steering gear designed for soft ground travel.
5. Special chassis frame. No Moto-Crane frame has ever failed.
6. 10 speeds forward—and 2 reverse. Unit will climb a 30% grade.

Ask your Lorain distributor for the big 32-page catalog showing 78 ways to speed work — save money with a Lorain Moto-Crane.

THE THEW SHOVEL COMPANY · Lorain, Ohio

2 Moto-Cranes, with 90' booms lifting a 6½-ton bottle washer to the 6th floor level.

Reg. Trade Mark

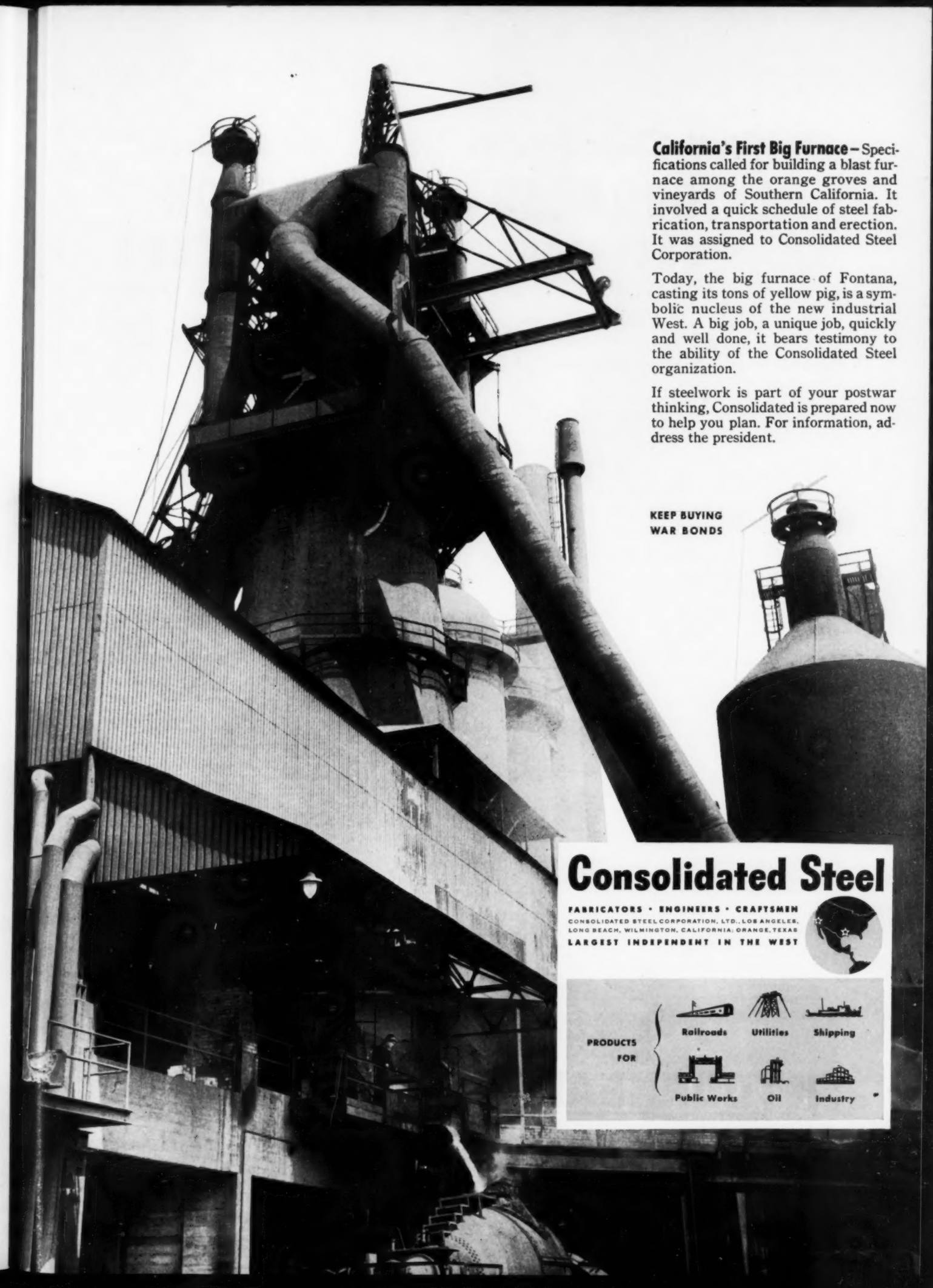
thew-Lorain

It's not a MOTO-CRANE unless it's built by THEW-LORAIN

CRANES · SHOVELS · DRAGLINES · MOTO-CRANES

PORTABLE ELECTRIC MEGAPHONE which is said to beam voice directly to desired area and project normal speech to long distances (as much as one-half mile under favorable conditions) is recommended for use of civil engineers, contractors and loggers whose workers are dispersed over a large

area. Construction details include a waterproof and watertight megaphone cabinet. Amplifier chassis is shock mounted to top section of cabinet, permitting easy access to component parts for ready servicing or replacement. Speakers and microphones contain new molded phenolic waterproofed diaphragms. Batteries provide 40 hr. of operation and are said still to retain 70 per cent of original voltages. Power is used only during actual voice transmission. Megaphone cabinet, 9½x4½x7⅛ in. and weighs 11¼ lb. Speaker is 13¼ in. long with 7¾ in.-dia. bell opening. Complete unit weighs 15 lb. 5 oz.—**National Scientific Products Co., 5013-25 N. Kedzie Ave., Chicago 25, Ill.**



California's First Big Furnace – Specifications called for building a blast furnace among the orange groves and vineyards of Southern California. It involved a quick schedule of steel fabrication, transportation and erection. It was assigned to Consolidated Steel Corporation.

Today, the big furnace of Fontana, casting its tons of yellow pig, is a symbolic nucleus of the new industrial West. A big job, a unique job, quickly and well done, it bears testimony to the ability of the Consolidated Steel organization.

If steelwork is part of your postwar thinking, Consolidated is prepared now to help you plan. For information, address the president.

KEEP BUYING
WAR BONDS

Consolidated Steel

FABRICATORS · ENGINEERS · CRAFTSMEN

CONSOLIDATED STEEL CORPORATION, LTD., LOS ANGELES, LONG BEACH, WILMINGTON, CALIFORNIA; ORANGE, TEXAS

LARGEST INDEPENDENT IN THE WEST

PRODUCTS FOR

Railroads · Utilities · Shipping

Public Works · Oil · Industry

It Will Pay You to Make the Nearest
LeTOURNEAU DISTRIBUTOR
your EARTHMOVING HEADQUARTERS

He Specializes in Fast, Rubber-Tired Power . . . Is Equipped and Trained to Provide Quick, Expert Service . . . Can Help You on Priorities

Your LeTourneau distributor was selected for his knowledge of construction equipment and his ability to render complete parts and repair service to LeTourneau users. Both his sales and service staffs have taken refresher courses to bring to you the latest and best war-tested practices of repair and equipment application.

When you need parts and repair service or new equipment, call your nearest LeTourneau distributor. He's listed below—he can help you get machinery for essential jobs NOW.

For faster, lower-cost earthmoving, use the rubber-tired power of Tournapulls.

ALABAMA
Construction Equipment Co., North Birmingham, Montgomery.

CALIFORNIA
Crook Company, Los Angeles.
Soule' Equipment Company, Oakland, Sacramento, Fresno.

COLORADO
The Colorado Builders' Supply Co., Denver.

CONNECTICUT
The Nicoll-Talcott Co., Hartford.

FLORIDA
Florida Equipment Company, Jacksonville, Miami, Tampa.

GEORGIA
Gill Equipment Co., Atlanta.

IDAHO
The Sawtooth Company, Boise, Twin Falls.

ILLINOIS
Chicago Construction Equipment Co., Chicago, Peoria.

INDIANA
Indiana Equipment Co., Inc., Indianapolis.

IOWA
James W. Bell Co., Cedar Rapids.

LOUISIANA
Universal Tractor & Equipment Co., Baton Rouge, Shreveport.

MARYLAND
General Supply & Equipment Co. Inc., Baltimore.

MASSACHUSETTS
Parker-Danner Company, Hyde Park.

MICHIGAN
Cyril J. Burke, Detroit.
Contractors Machinery Co., Grand Rapids.
Straits Engineering Company, Sault Ste. Marie.

MINNESOTA
Phillippi-Murphy Equiment Co., Minneapolis.

MISSOURI
The Victor L. Phillips Co., Kansas City.
Rozier-Ryan Company, St. Louis.

MONTANA
Montana Powder & Equipment Co., Helena.

NEBRASKA
Miller-Husselbalch Co., Omaha.

NEVADA
Sierra Machinery Co., Reno.

NEW HAMPSHIRE
Parker-Danner Company, Goffstown.

NEW MEXICO
Contractors Equipment & Supply Co., Albuquerque.

NORTH DAKOTA
Smith Commercial Body Works, Inc., Fargo.

OHIO
Gibson-Stewart Co., Cleveland.

OKLAHOMA
Wylie-Stewart Company, Oklahoma City.

OREGON
Loggers & Contractors Machinery Co., Portland, Eugene and Klamath Falls.

PENNSYLVANIA
Furnival-Rimmer Co., Philadelphia.
Dravo-Doyle Company, N.S. Pittsburgh.

RHODE ISLAND
Parker-Danner Company, Providence.

SOUTH CAROLINA
Concrete Construction and Supply Co., Columbia.

TENNESSEE
Dempster Bros., Inc., Knoxville.
Tri-State Equipment Co., Inc., Memphis.

TEXAS
Conley-Lott-Nichols Machinery Co., Dallas.
Contractors Equipment & Supply Co., El Paso.
J. E. Ingram Equipment Co., San Antonio.

UTAH
Landes Engineering Co., Salt Lake City.

VIRGINIA
Phillips Machinery Co., Richmond.

WASHINGTON
Pacific Hoist & Derrick Co., Seattle.

WISCONSIN
Hunter Tractor & Machinery Co., Milwaukee.

CANADA

ALBERTA
Costello Equipment Co., Ltd., Calgary.

BRITISH COLUMBIA
Vancouver Equipment Corp., Ltd., Vancouver.

MANITOBA
Mumford, Medland, Ltd., Winnipeg.

ONTARIO
The General Supply Co. of Canada, Ltd., Toronto

QUEBEC
The General Supply Co. of Canada, Ltd. (branch), Montreal.

SASKATCHEWAN
J. R. Paisley, Ltd., Regina.

For expert repair and genuine parts, be sure to contact your official LeTourneau distributor—he's listed above.

LETOURNEAU TOURNAPULLS

PEORIA, ILLINOIS . . STOCKTON, CALIFORNIA

Manufacturers of TOURNAPULLS*, ANGLEDOZERS*, BULLDOZERS, TILTDOZERS*, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, TOURNATRAILERS*, TOURNACRANES*, TOURNATRUCKS*, SHEEP'S FOOT ROLLERS, TOURNAROPE*, TOURNAWELD*, TOURNALIFTS*

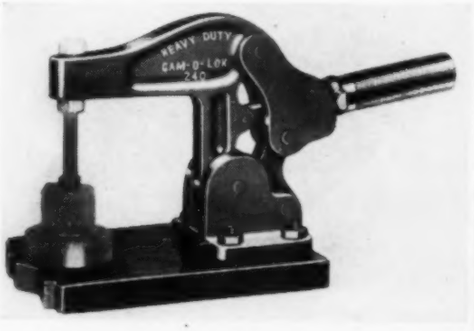
*Trade Mark Reg. U.S. Pat. Off.

SELF-DUMPING HOPPER is an all-metal skid bin with a hinged bottom easily picked up and moved by hand-lift truck and useful for handling brick scrap, cinders and ashes, dry clays, sand, coal and coke, small parts, batch ingredients and sawdust. Dumping is done by elevating hopper by

means of truck forks until bin handle engages with a positive-action at top of truck elevating column. Forks then are lowered, leaving hopper suspended. Anti-friction rollers on back of bin permit forks to slide down easily. Unsupported hinged bottom opens, allowing contents to pour forth wherever desired. Dumping operation can only be accomplished when unit is employed in conjunction with an electric fork truck.—**Yale & Towne Manufacturing Co., Philadelphia 24, Pa.**

★ ★ ★

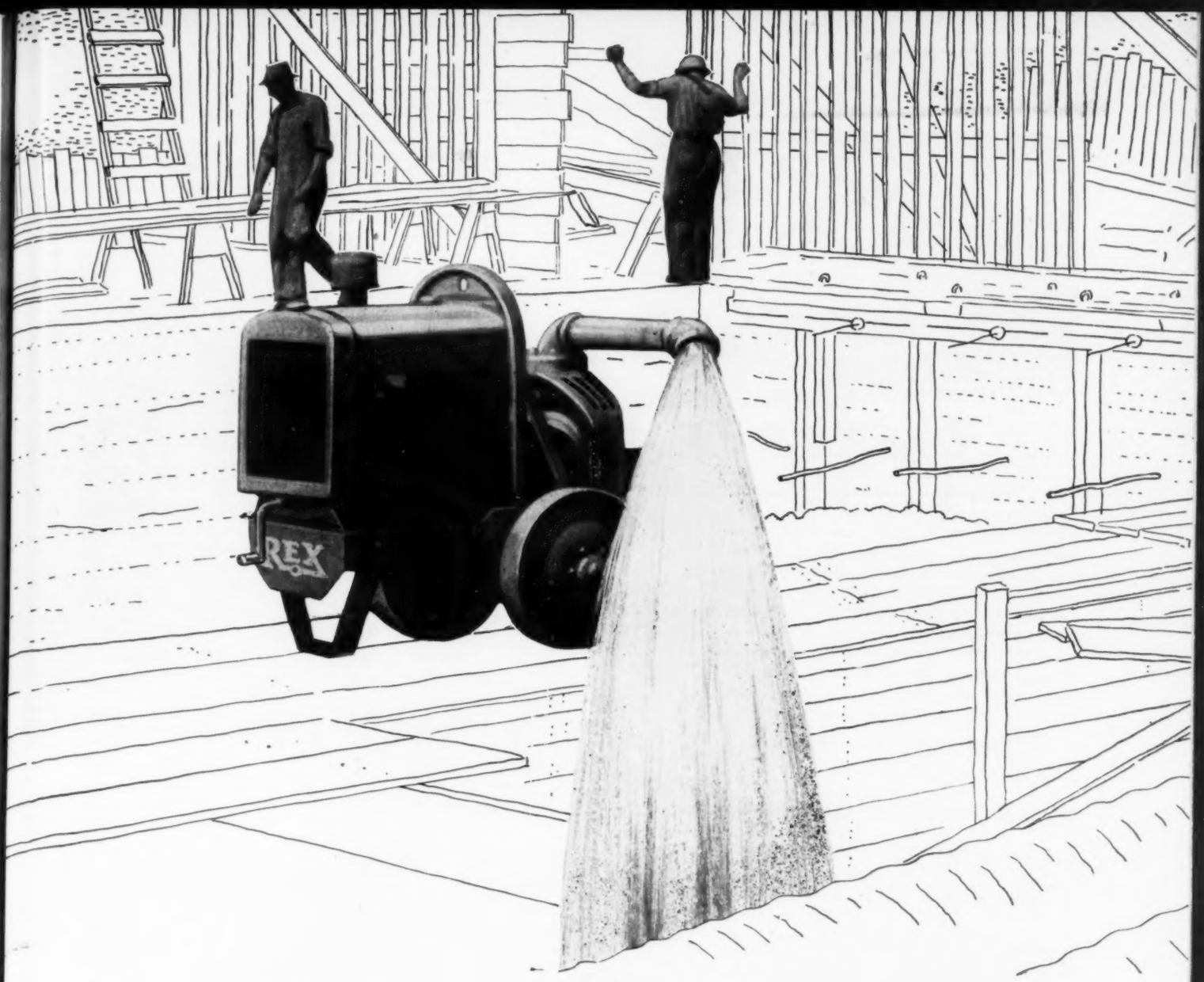
NEW FAST WORKING CLAMP, called "Cam-O-Lok," is made in three types for light, medium and heavy-duty service and is instantly adjustable over entire range of its vertical holding capacity. When objects to be held vary in thickness, no



adjustment of holddown bolt is necessary to obtain desired clamping pressure. Locking and unlocking are accomplished by threaded element in positioning handle. Lubrication is provided for threads. Design is compact, all dimensions having been held to a minimum to permit use of tool in assembly and holding fixtures where space is limited. Sturdily built to withstand hard and long service.—**Mechanics Engineering Co., Jackson, Mich.**

SAFETY JACKET in black and white checkerboard design, for use of helpers at open manholes, track workers, switchmen, night patrolmen, directors of traffic in all locations where men are working in hazardous locations, offers high visibility day and night and distinctly marks a man no matter at

what point or under what conditions he is operating. Designed in form of vest, patterned large enough to fit over regular clothing, providing ample room for working in normal manner. Button front; buckle adjustment in back; one large pocket. Made of 10-oz. pre-shrunk canvas. Black blocks woven in fast color (not painted). Said to launder satisfactorily and not to fade.—**Industrial Products Co., Philadelphia 33, Pa.**



You start the motor— it does the rest!

When you use a Rex Speed Prime Pump, all you have to do is start the motor—it practically operates itself. You don't have any worries about priming or re-priming. That's all handled automatically by the Rex recirculating valve and the sensational "Air-Peeler" that literally peels air from the impeller and rushes it out the discharge. This fast automatic prime and great air handling ability allows a Rex Pump to start moving water in the shortest possible time.

Rex Pumps are built for service, too. Their "Free-Flow" design eliminates water "detours"—assures a straight-line flow that increases pump efficiency. It's natural, though, that Rex Pumps should be designed right. They are made by the manufacturers of Rex Mixers, Moto-Mixers, Pavers and Pumpcrete which have been outstanding performers in the construction field for many years.

For information on Rex Pumps, send for Bulletin No. 433. And check the other Rex construction equipment: Mixers, to cut concrete placing costs; Moto-Mixers that speed the mixing, hauling and placing of concrete . . . Pavers that can give you really heavy yardage production faster—Pumpcretes, the pumps that pump concrete by pipeline. See your Rex Distributor or write to Chain Belt Company, 1664 W. Bruce St., Milwaukee 4, Wis.

COOPERATIVE CONSTRUCTION BUREAU CCB

CHAIN BELT COMPANY *of Milwaukee*

REX

CONSTRUCTION MACHINERY

PUMPS PAVERS PUMPCRETES MOTO-MIXERS MIXERS

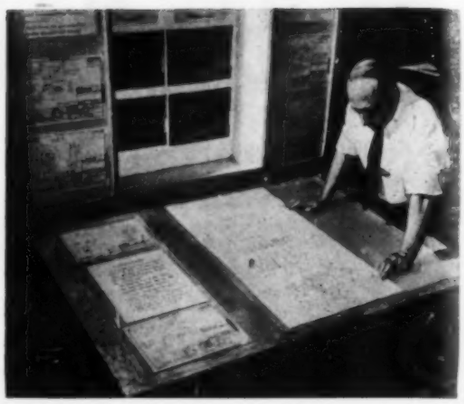
CRANE STABILITY GAGE. for use on boom-type cranes and similar equipment, safeguards this type of equipment by measuring its stability against handling loads in excess of the rated capacity at a given radius and against extending the boom to an excessive radius for a given load. Thus dependence upon operator's judgment is eliminated and maximum use of the crane is permitted. Consists of a strain gage and accompanying balancing

unit, an indicating unit, a constant voltage transformer and a boom angle compensator. Indicating unit contains a partial bridge circuit, various transformers, a sensitivity adjustment and an electronic relay for operating the alarm circuits, or in the case of cranes with full magnetic control, the control circuits. Constant-voltage transformer, which is used in the gage power circuit to prevent interference by voltage variations, permits accurate gage operation despite variations within the range of 95 to 125 v. on 60 cycles frequency, accurate to plus or minus one cycle. Boom angle compensator, which is a small, rotary voltage regulator, is furnished for compensating the gage circuit output for various boom angles.—**General Electric Co., Schenectady, N. Y.**

★ ★ ★

BLUEPRINT REPRODUCTION TESTER. called the Legimeter and invented by Douglas J. Wishart, is a device for predetermining whether or not a drawing will reproduce satisfactorily while it is still in the hands of the draftsman, or in the case of older drawings, before they are sent to the blueprint machines. It consists of a two-panel illuminated table. In the first panel are samples of drawings from which satisfactory prints have been made by the Army and Navy and which have been selected as providing adequate contrast. The second panel is a clear sheet of ground glass on which drawing to be evaluated is placed. Since both panels are illuminated by light of the same intensity, the draftsman can determine at a glance whether the test drawing is heavy enough for satisfactory reproduction. In addition to the comparison table, the Legimeter includes additional devices for the instruction and training of inexperienced draftsmen in a three-panel backboard, consisting of two outside illuminated panels, one containing examples of satisfactory drawings and the other examples of unsatisfactory drawings. In the center illuminated panel are blueprints made from these drawings which have been accepted or re-

(Continued on page 106)



(Continued from page 104)

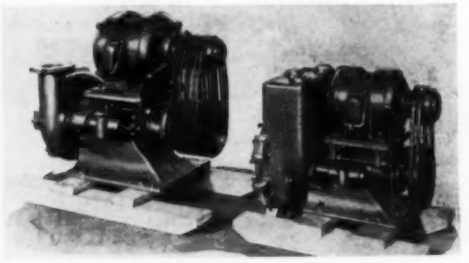
jected by the Army. This backboard enables young draftsmen to see the difference between a drawing that looks all right and one which will reproduce satisfactorily.—**The Glenn L. Martin Co., Baltimore, 3, Md.**

★ ★ ★

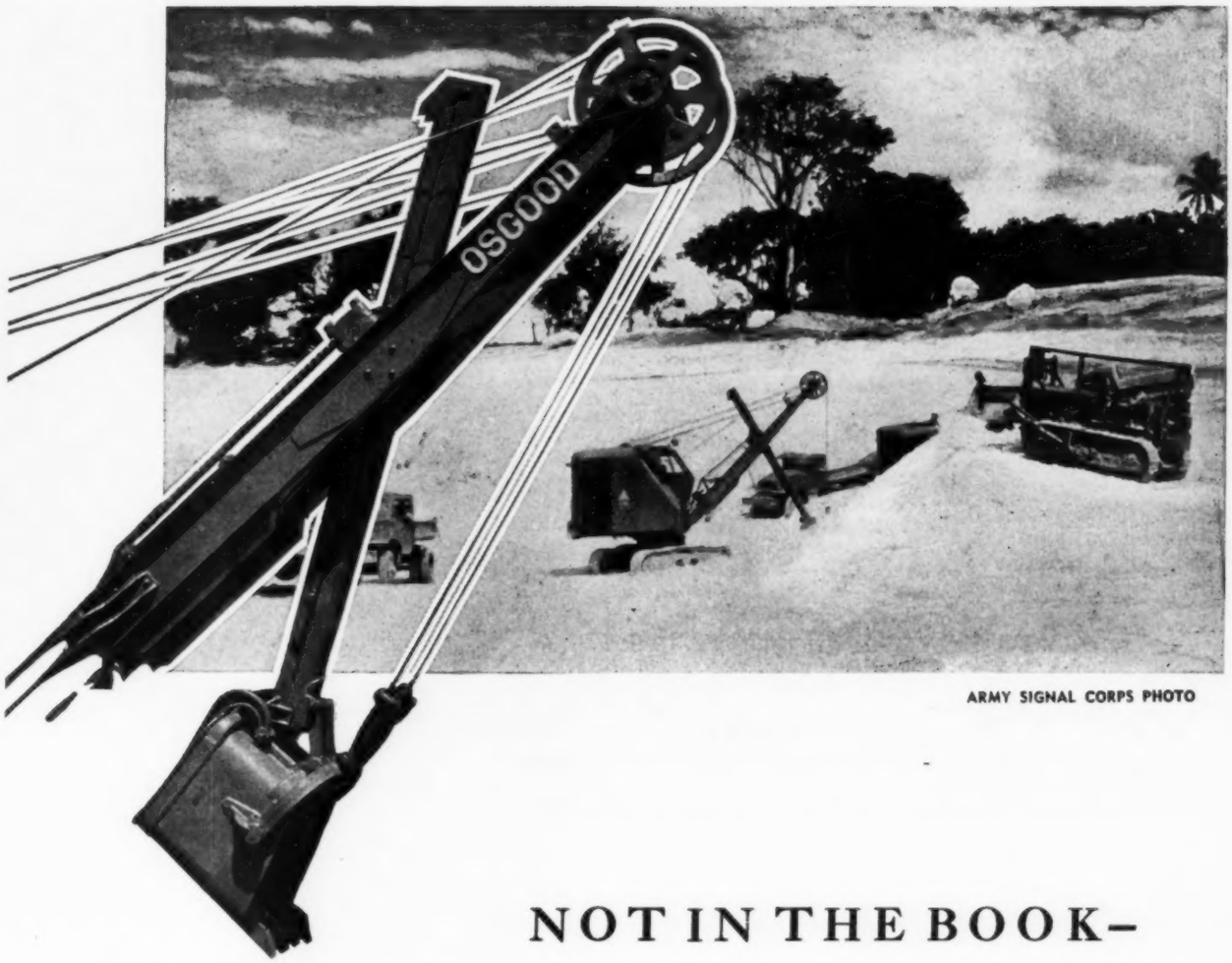
NEW ELECTRICAL INSULATING VARNISHES, when used in making electrical equipment where design limitations are based on insulating temperature, have made possible reductions in weight of as much as 50 percent in these units and have effected substantial increases in output of small motors where the operating temperature can be raised. In the accompanying photograph the motor on the right is twice as large as the one on the left, but both produce 10 hp. at 1,750 rpm. Higher operating temperature makes this possible. Right-hand motor is made with Class A insulation and operates at 105 deg. C total hot-spot temperature, while the left-hand motor is made with high temperature Silicone varnish. Right-hand motor weighs 410 lb.; left-hand unit weighs 210 lb. — **Insulation Development Group, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.**

★ ★ ★

OVERHEAD MOUNTED MOTOR is new feature of Amsco-Nagle centrifugal pumps of horizontal type which assures following advantages: (1) Pump can be operated at more accurate speeds; (2) speed changes can be provided when necessary; (3) motor



is stationed at more accessible point and is at same time protected against flooding; (4) arrangement requires less floor space for installation. Photograph shows 5-in. type "T" pump and, at right, a 2-in. type "A" pump, both of which are available with overhead mounted motors.—**American Manganese Steel Div., American Brake Shoe Co., Chicago Heights, Ill.**



ARMY SIGNAL CORPS PHOTO

NOT IN THE BOOK–

But All In The Day's Work

Red coral of tropical islands wasn't given much consideration when the "daddy" of this OSGOOD shovel was designed.

Yet today dependable OSGOOD "20's" are perfectly at home, excavating road and runway material from rock-hard coral pits of South Pacific Islands and otherwise doing their part along the "trail to Tokyo."

Such "digging ability" is typical of daily OSGOOD performance under *all* conditions (often under enemy fire) from the tropics to the tundras. It is evidence of the power, stamina, and versatile OSGOOD efficiency that peace will divert to *your* requirements.

THE GENERAL EXCAVATOR COMPANY
CRANES, DRAGLINES AND SHOVELS
DIESEL, GAS, ELECTRIC

Associated with The General Excavator Company

OSGOOD

THE OSGOOD COMPANY • MARION, OHIO

OSGOOD
SHOVELS, DRAGLINES CRANES
CRAWLER & WHEEL MOUNTS
DIESEL, OIL, GAS, ELECTRIC

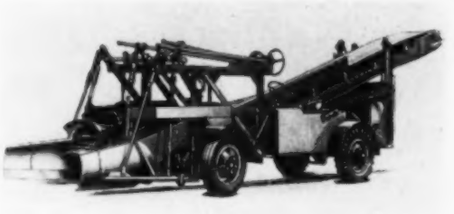
DC. GENERATORS FOR GAS ENGINE DRIVE are available in sizes from 1 to 200 kw., for voltages ranging from 15 to 600, and for direct assembly to engine frame or for belted drive. Bolts directly to engine housing and engine shaft. Equipped with one ball bearing. Engine end of rotor is supported by engine bearing.—**Century Electric Co., 1806 Pine St., St. Louis, Mo.**

★ ★ ★

SYNTHETIC RUBBER ADHESIVE for plywood bonding and heavy timber lamination is a low-temperature-curing product of the phenol-formaldehyde type and is said to be particularly useful in the manufacture of oak ship keels and laminated structural members for columns, timbers, arches and trusses. Preparation of the glue, called Amberlite PR-75-B, is a simple operation requiring no special equipment nor unusual techniques. Resin solution is first weighed, the catalyst is then added and the mixture is stirred. Water at normal room temperature is added and after brief stirring the glue is ready for use. After correct formulation the glue contains approximately 70 percent of solids and exhibits a viscosity which is suitable for spreading by brush or mechanical spreaders.—**Resinous Products & Chemical Co., Philadelphia, Pa.**

★ ★ ★

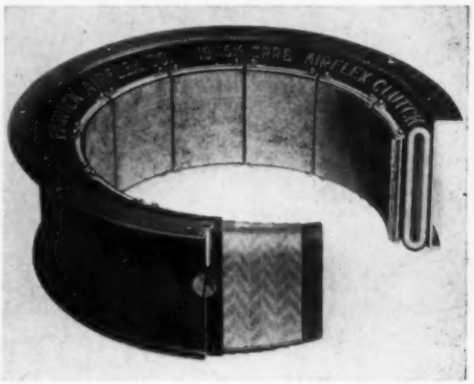
SELF-PROPELLED, FORCE-FEED LOADER, operating as a companion tool to the motor grader on highway maintenance or on construction jobs, loads surplus earth, sod, rock, sand, oil mix and unruly materials into trucks for removal. Also permits



salvaging of road surfacing materials for use on other jobs. Unit is one-man operated and travels under its own power at highway speed from one job to another. Removing windrows of debris accumulated in ditch cleaning is also handled competently by this loader, according to its manufacturer.—**Athey Truss Wheel Co., 5631 W. 65th St., Chicago 38, Ill.**


AMERICA IS
Built with Aggregate!
SMOOTHER BEDS
for RAILROADS!
Building the nation's vast network of railroads created a market for countless millions of tons of aggregate and each year millions more should be added to keep them smooth. During the past few years this has been impossible because of labor shortages.
The outlook now is for ballast to be one of the big markets for producers of crushed stone and gravel. The railroads have plenty of funds available for track maintenance and, if the supply of labor permits, they will use it for that purpose.
Cedarapids aggregate producing and crushing equipment will help you produce better aggregate for ballast, highways, airports and other construction jobs, and it will cost you less too. Remember this — the Cedarapids line is complete and will meet any aggregate production problem either from the standpoint of output or character of materials for either an entire plant or a single piece of equipment. You'll be way ahead if you come to Iowa now for your essential needs and be one of the first in line for postwar deliveries. See your Iowa dealer right away or write direct.
IOWA MANUFACTURING COMPANY
CEDAR RAPIDS, IOWA
CEDAR RAPIDS
ARMY E NAVY
Ewing Galloway Photo
Cedarapids
Built by IOWA
THE IOWA LINE
of Material Handling Equipment Includes
ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS—STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING SCREENS
STRAIGHT LINE ROCK AND GRAVEL PLANTS
FEEDERS — TRAPS
PORTABLE POWER CONVEYORS
PORTABLE STONE PLANTS
PORTABLE GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE ASPHALT PLANTS
TRAVELING (ROAD MIX) PLANTS
DRAG SCRAPER TANKS
WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS

AIR-OPERATED CLUTCH, known as Fawick Airflex, for use in operating heavy machinery, such as oil well drilling hoists, where heavy load is intermittently carried through the medium of an engaged clutch between load and power and also for adaptation to light loads, has a tire-like rubber gland which expands as compressed air is introduced into it and thus effects a union between the driving and driven members of any industrial machine. Compressed air is utilized in this clutch for smoother, simpler and more positive action. Since there are no toggles, arms, springs, levers or bearings, lubrication and adjustment become unnecessary. Flexibility of tire-like gland insures uniform pressure over the entire clutch face and automatically corrects misalignment of the driving shaft with the driven shaft.—**The Fawick Airflex Co., Cleveland, Ohio.**



Why "PACKAGED" Bridges and Sewers are Popular with Contractors

This stack of plates built nearly 200 feet of 120-in. diameter pipe.

Erecting a "packaged" culvert, 165 inches in diameter.

Just as shipbuilding methods have been revolutionized by prefabrication and other time-saving methods, so will post-war construction be simplified and speeded by product manufacturers and contractors. One of these practical ideas is the "packaging" of small bridges and large sewers.

Almost as simple as changing a tire on an automobile is the assembling and bolting of ARMCO Multi Plate. The easily-handled, pre-curved corrugated plates are nested together for saving space in shipping, hauling and storing. Construction is done with unskilled labor and the simplest equipment and small tools.

The "form" is the finished structure. No curing, no waste, no delay. Other operations are speeded up too.

ARMCO pioneered and developed this "packaged" product. Before the time comes to bid and build these structures, get complete information from Armco Drainage Products Association, 355 Curtis Street, Middletown, Ohio.

MULTI ARMCO PLATE

ARMCO

Multi Plate

LOADING SCOOP, operated by truck's own power and requiring only the driver for loading operations, has longer studs to replace usual driving studs and to hold ratchet on outer end of each rear wheel. By backing into rigid arms that extend forward from each side of the scoop, mechanism automatically locks in place. Driver continues backing until shovel has been pushed into pile of material. Truck then moves forward, ratchets engage

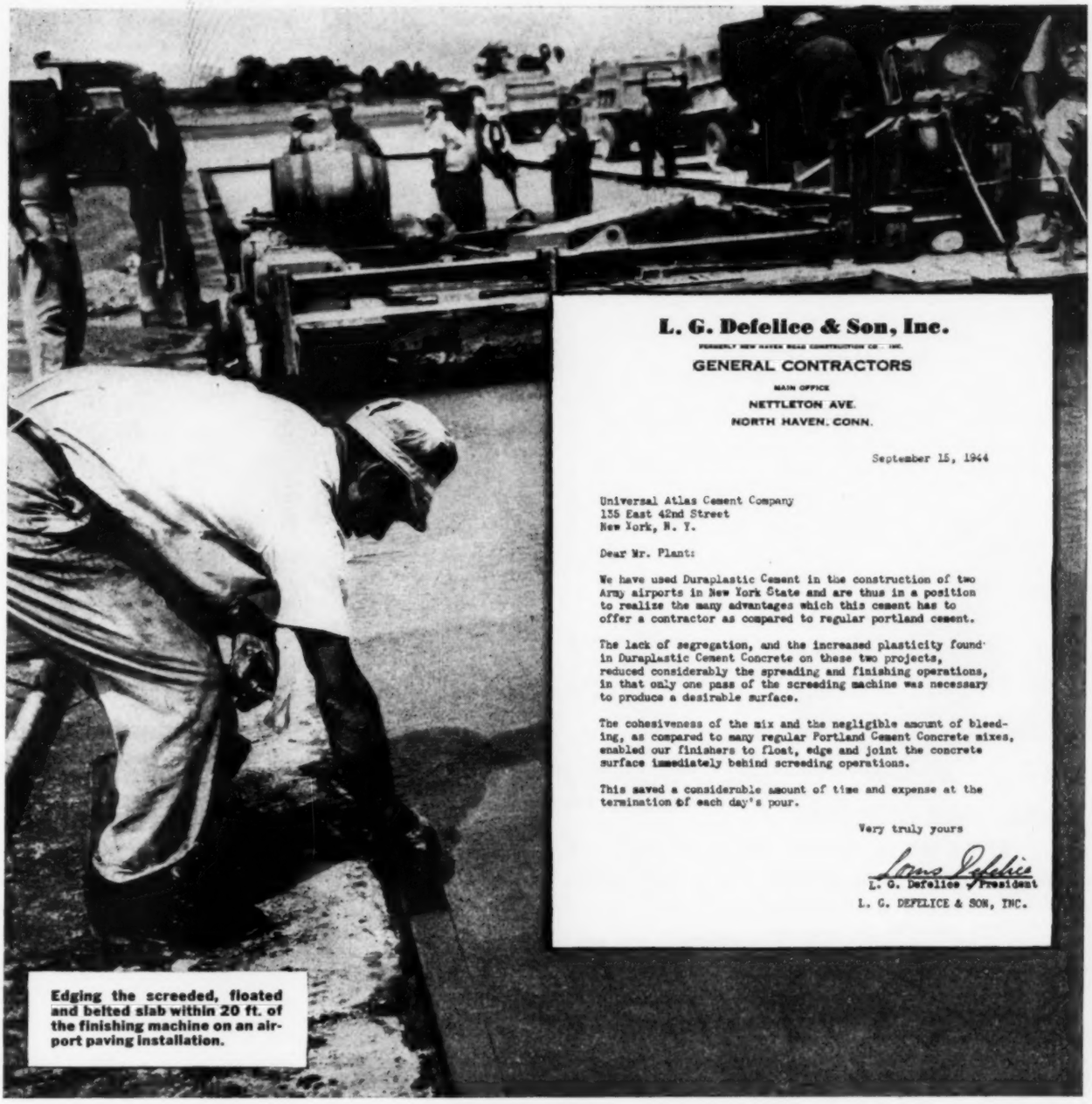
shovel arms and loaded scoop is swung up and over body into which material is dumped. When scoop reaches topmost position, it is automatically held by catch released by an arm within easy reach of driver. Upon reversing truck, scoop is lowered to ground and backward-forward operating cycle is repeated until truck is fully loaded. In initial tests loading took about 1 min. per ton of material. By regulating forward speed or by stopping earlier or later, driver can determine point at which scoop deposits its load in truck. Scoop's design permits even loading from front to tailgate without spilling. When truck is loaded, scoop may be left locked in top position and carried with truck which can be dumped with scoop in place. If left behind for use by another truck, driver merely disengages scoop at each rear wheel by lifting simple locking mechanism off hub extension. By fitting each truck with hub mechanism and top-lock catch, contractor can make one scoop serve his entire fleet. First tests of finished model, on which patent claims have been allowed, were made with wet sand which the La Pointe loader is claimed to have handled with ease.—**LaPointe Engineering Co., Unionville, Conn.**

★ ★ ★

TYPE CLEANER removes accumulated grime, dust, and dirt from type bars, type keys and platen rollers, typewriters, adding, bookkeeping and billing machines with resultant reduction in repair bills, according to its manufacturers.—**Reliance Pencil Corp., Mt. Vernon, N. Y.**

Contractor speeds paving operations with Atlas DURAPLASTIC* air-entraining cement

Greater plasticity, lack of segregation and absence of bleeding save time on each day's operation



L. G. Defelice & Son, Inc.

FORMERLY NEW HAVEN ROAD CONSTRUCTION CO., INC.

GENERAL CONTRACTORS

MAIN OFFICE
NETTLETON AVE.
NORTH HAVEN, CONN.

September 15, 1944

Universal Atlas Cement Company
135 East 42nd Street
New York, N. Y.

Dear Mr. Plant:

We have used Duraplastic Cement in the construction of two Army airports in New York State and are thus in a position to realize the many advantages which this cement has to offer a contractor as compared to regular portland cement.

The lack of segregation, and the increased plasticity found in Duraplastic Cement Concrete on these two projects, reduced considerably the spreading and finishing operations, in that only one pass of the screeding machine was necessary to produce a desirable surface.

The cohesiveness of the mix and the negligible amount of bleeding, as compared to many regular Portland Cement Concrete mixes, enabled our finishers to float, edge and joint the concrete surface immediately behind screeding operations.

This saved a considerable amount of time and expense at the termination of each day's pour.

Very truly yours

Louis Defelice

L. G. Defelice, President
L. G. DEFELICE & SON, INC.

Edging the screeded, floated and belted slab within 20 ft. of the finishing machine on an airport paving installation.

ATLAS DURAPLASTIC CEMENT

A Universal Atlas Product

CM-D-9

**Trade Mark Registered, U. A. C. Co.; all rights reserved.*

NEWS FROM MANUFACTURERS
About Their Products

The publications reviewed below will keep you posted on latest developments in construction equipment and materials available for your use.

DIESEL ENGINES—**Caterpillar Tractor Co.,** Peoria, Ill. (16-p. booklet, two-color, illustrated.) Power users interested in knowing reasons for flexibility and dependability of Caterpillar diesel engines and what makes them stand up under the heavy tasks commonly given them, will find a concise simple explanation in this booklet, which is full of action pictures and drawings illustrating the features which are claimed to bring top performance, low-cost operation and long life to tractors, motor graders and engines powered by these units. Seals and filters, the fuel system, lubricating oil and water cooling systems starting engines and other features are shown in drawings and photographs and are clearly described.

★ ★ ★

FLAT SPRAY NOZZLES—**Chain Belt Co., Milwaukee, Wis. (8-p. folder.) Describes and illustrates** these Rex units which are in service in practically **all industries where water is used in cleaning, cooling** and washing operations. They are made in a variety of sizes and from a variety of materials. **Besides** illustrating and describing **nozzle uses,** folder gives tabular information concerning their discharge in gallons **per minute;** their dimensions; a list of materials, sizes and **prices.**

★ ★ ★

WINDOWS FOR HOMES—**Mesker Brothers,** 424 S. **Seventh** St., St. Louis 2, Mo. (26 pp., illustrated) **Describes** and illustrates prefabricated **steel casements designed to eliminate** labor costs of fitting, adjusting and hanging sash and weights. No inside wood trim is required with these casements. Standard sizes may be used singly or in combination to produce almost any size window opening architect may require. For large picture windows, stationary (non-ventilator) sizes are available in all widths and heights. Ventilation up to 100 percent can be achieved by use of proper types, according to the manufacturer. Advantages of use of these windows, as enumerated in the bulletin, are: (1) **Really** "Homey" in modern, up-to-date sense; (2) **steel** structure assures investment for lifetime of house; (3) cool in summer; (4) easy to clean; (5) **inside screens** permit keeping in place year round without storage problems.

How We Harnessed a Magnet to Eliminate Wear

Where there is no mechanical contact between moving parts, no wear can take place. This is the principle which P&H uses to transmit power for hoisting the dipper of the new P&H Electric Shovel. The *Magnetorque Drive* transmits torque by electro-magnetic forces rather than by mechanical contact. Designed specifically for Electric Shovel operation, it eliminates motor commutation problems, sliding gears, mechanical clutches and other complicated mechanisms. Reversing the hoist motor is no longer necessary. Hoisting is completely independent of all other operations.

The *Magnetorque Drive* is typical of the advanced engineering and simplicity embodied in every detail of the new P&H Electric Shovel. Write for full information about the new P&H Electric Shovels.

P&H ELECTRIC SHOVELS
4494 W. NATIONAL AVE.
MILWAUKEE 14, WISCONSIN
HARNISCHFEGER CORPORATION
EXCAVATORS • ELECTRIC CRANES • ARC WELDERS (P&H) HOISTS • WELDING ELECTRODES • MOTORS

THE GREATEST FORWARD STEP EVER MADE IN ELECTRIC SHOVEL DEVELOPMENT

DUST COLLECTORS—**Ralph B. Carter Co.**, 92 Atlantic St., Hackensack, N. J. (4 pp., illustrated.) Five models of Markley-Carter dust collectors for rock drill dust control and industrial dust collection are described and illustrated. For rock drilling, detachable hood on drill steel at bore hole traps dust, which is then conveyed through hose to portable collector unit. Disposal container permits continuous collection of dust samples, if desired, without stopping operation.

★ ★ ★

PLASTIC COATINGS—**Amercoat Div., American Pipe and Construction Co.**, P.O. Box 3428 Terminal Annex, Los Angeles 54, Calif. (16 pp., illustrated.) Illustrates and describes many uses of Amercoat in wide range of industries, including a comprehensive list of organic and inorganic materials, foods, and beverages and actual equipment and structures that are now being protected against corrosion and contamination.

★ ★ ★

CARRYING SCRAPERS—**R. G. LeTourneau, Inc.**, Peoria, Ill. (8-p. pamphlet.) Citing specific yardage comparisons and greater speeds and illustrated with numerous pictures, pamphlet claims that more power and less weight increases Tournapull production, discusses values of rubber-tired earth-moving equipment, interchangeability of powerful Tournapulls with carryall scrapers, Tournatrailers, cranes and other units and contains many contractor-named job illustrations.

It has to work alone and like it

No and's, if's or but's about it, a Homelite Portable Generator, installed in a plane or a tank is in no position to receive nurse-maid attention. It's usually crammed into some hot, tight corner where it is practically impossible to service it.

Which means just one thing . . . a Homelite Generator with its built-in gasoline engine has to work and stand up under the toughest kind of usage . . . hours on end . . . without receiving any attention or service. To meet demands like this . . . born of war . . . Homelite engineers have developed a higher powered, lighter-weight and, above all, a more dependable gasoline-engine-driven generator... a compact, portable Homelite that will meet and pass the performance requirements of any peace-time job.

HOMELITE CORPORATION
PORT CHESTER, NEW YORK

FOR YOUR PEACE-TIME JOBS

The new Homelite Portable Generators that you will use after the war for operating brilliant floodlights or electric tools will work better in winter and summer. They will be more dependable even under the toughest operating conditions. They will work longer hours without attention or service . . . and will be more rugged and powerful than ever before.

Portable Pumps - Generators - Blowers

WELLPOINTS FOR DEWATERING EXCAVATION—**Moretrench Corp.**, 90 West St., New York 6, N. Y. (102 pp., illustrated) Descriptive material, profusely illustrated with job photographs, is presented in two parts, the first dealing with a wide range of specific applications, each illustrated by photographs or drawings, and the second with data on wellpoints, pumps, parts, fittings and service. Predraining of excavations with wellpoints allows work to proceed "in the dry" and often eliminates the need for sheeting. Water pumped from wellpoints in place may frequently be used for jetting new wellpoints into the ground ahead of excavation. Among types of work on which wellpoints have been used to lower the groundwater level and speed construction, each briefly described and illustrated in the booklet, are sewer and pipeline trenches, foundations for buildings and industrial plants, pumping and power stations, dams and locks, drydocks, subways, tunnels, seawalls, bridge piers, sewage treatment plants, and ship construction basins. The second part of the book explains how wellpoints are jetted down into position sometimes with the aid of a hole-puncher" in resistant soils. Quick-couplings are provided for header pipe. Details are given for Moretrench pumps in 6-, 8- and 10-in. sizes. These wellpoint systems may be either bought or rented for job use.

★ ★ ★

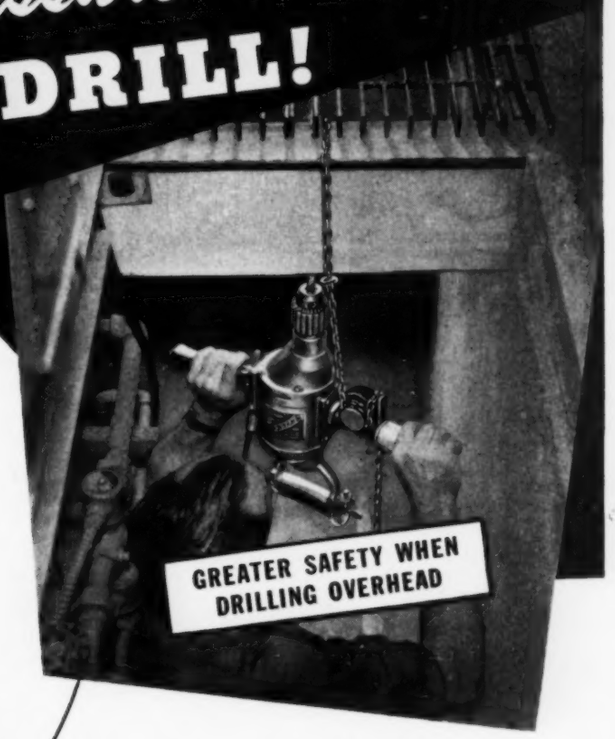
FAN-COOLED, WORM-GEAR REDUCTION UNITS—The Cleveland Worm & Gear Co., Cleveland, Ohio. (16 pp., illustrated.) Comprehensive exposition of these units with full details of Speedaire principle is accomplished by means of cutaway photographs, charts, diagrams and engineering tables.

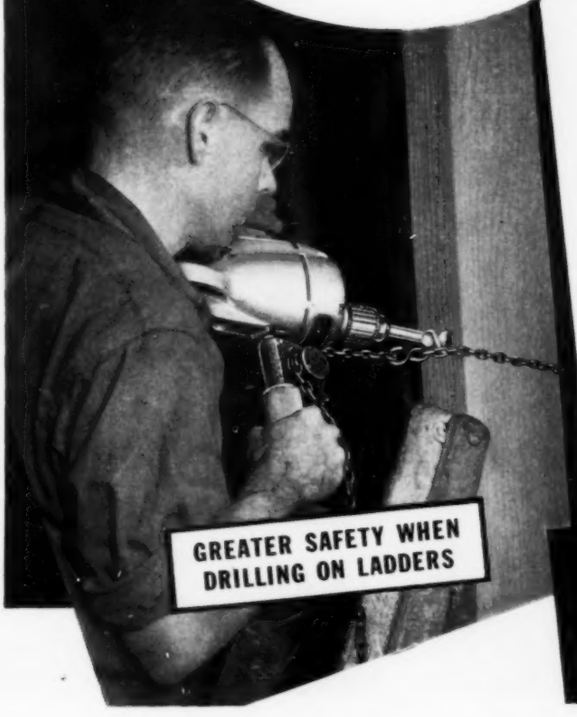
With Speedaire, heat generated during operation of unit passes through oil bath to deeply-finned wall of reservoir. Exhaust fan on coupling end draws a continuous stream of air at high velocity between double walls that form lower half of unit, completely scouring surface and providing an effectual transfer of heat. Catalog states that as result of this improved cooling, smaller sizes of Speedaire units may be applied to a given installation than have been possible heretofore, offering in some cases as much as twice capacity of standard worm gear units of equal frame size when operated with 1,750-rpm. motors, according to manufacturers. Design engineer will find in this book carefully detailed instructions for planning installations of Speedaire units, with illustrative examples. Supplementing these instructions are rating tables for six sizes ranging from 4¾- to 12-in. centers. Full information also is provided on dimensions and shipping weights.

★ ★ ★

PNEUMATIC SPONGE PUMPS—**Byron Jackson Co.**, P.O. Box 2017, Terminal Annex, Los Angeles, Calif. (4-p. bulletin.) Describes and illustrates this unit designed for pumping heads up to 150 ft. in single stage, and 300 ft. in two stages, and is applicable for use in mine shafts and winzes, cofferdams, caissons, sumps, cisterns, pits, tanks, basements, manholes and bilges; on construction projects for salvage work or other similar applications where pumped fluid contains heavy percentage of solids.

MAKE ANY DRILLING JOB in any position EASIER with this *Pressure Handle* on a SKILSAW DRILL!





● Now you can drill with *extra ease* and *extra safety* in any position . . . head-high, overhead or on ladders . . . by simply attaching this Pressure Handle to your SKILSAW DRILL *or any make of drill.* Pressure Handle gives the operator complete control of drilling pressure at all times . . . eliminates twist drill breakage . . . saves the time of an extra man with ropes or chains to hold the drill.

Fits SKILSAW DRILL Models "64", "80", "82", "83", "101", "103", "121", "123", "141", "143", and all other makes of electric or pneumatic drills of from ⅜ in. to 1 in. capacity in steel.

Sold Nationally Through Skilsaw Distributors for $30.

Ask your distributor today for a demonstration of this Pressure Handle on your own work.

SKILSAW, INC.
5033-43 Elston Avenue, Chicago 30, Ill.
Sales and Service Branches in All Principal Cities

SKILSAW PORTABLE ELECTRIC TOOLS
MAKE AMERICA'S HANDS MORE PRODUCTIVE

OFFICIAL ARMY ENGINEER *News* FROM EUROPEAN THEATRE OF OPERATIONS

(Continued from page 83)

route to the German front are maintaining a steady flow of the petroleum while Engineer crews rush the completion of new sections of the giant pipeline system. Light alloy pipes, devised especially for this operation by the U. S. Army Engineers and American commercial oil companies, are being used.

New-type Army Engineer organizations, Engineer Petroleum Distribution Groups, are handling both the construction and operation of this pipeline system. Personnel

(Continued on page 122)

(Continued from page 120)

for these new Engineer organizations was recruited from among the oil fields of Texas, Louisiana, Oklahoma and California.

The rapid pace of construction has at least once carried the pipeline Engineers well into enemy territory. During the Normandy campaign, Engineer surveyors plotting the course of the rapidly advancing pipeline found themselves behind the German lines, well ahead of the forward U. S. units. Seventeen Nazi prisoners were brought back by the Engineers.

The giant pipeline system is designed to serve all petroleum needs of the Army. Three types are being pumped through the lines: motor transport gasoline, high octane aviation gasoline, and diesel oil. Scattered at strategic points along the pipeline route are large-capacity tank farms where a portion of the petroleum is pumped away for use by supply units and at air bases behind the U. S. lines.

★ ★ ★

Full-Depth Internal Vibration

(Continued from page 70)

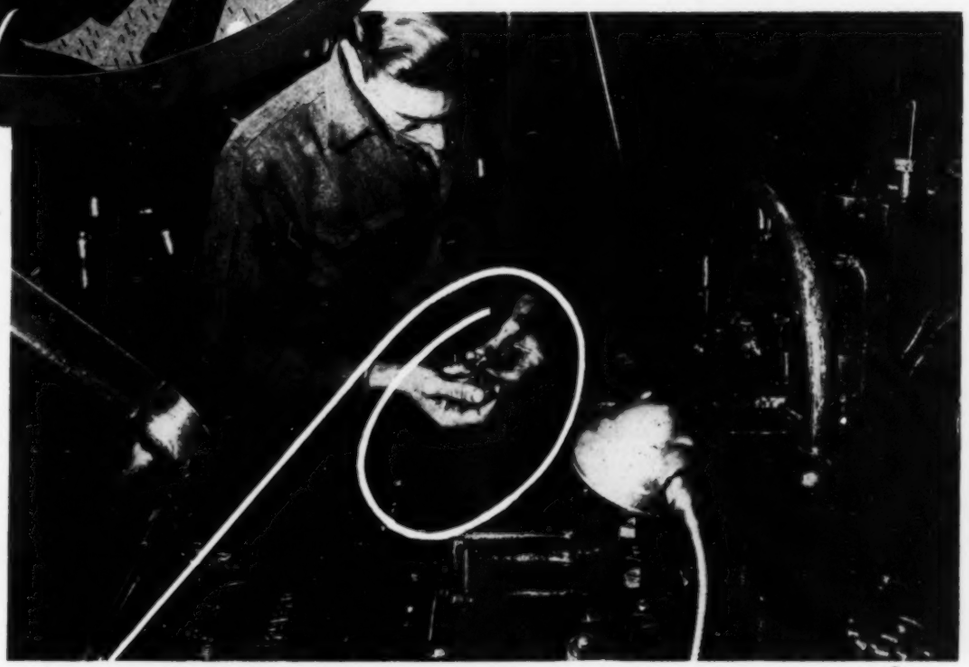
delivered by 7½-ton asphalt trucks and spread and finished by a Barber-Greene machine and consolidated by Buffalo-Springfield rollers.

Vibrating 12-In. Slab

Internal vibration of the 12-in. thick concrete slabs of the runway was done with a new type of multiple, high-speed, heavy-duty, full-depth machine manufactured by the Viber Co., of Burbank, Calif. As illustrated herewith, this machine, spanning the forms for the 25-ft.-wide concrete slabs forming the runway and the taxi lanes, is equipped with an oscillating screed and a battery of 8 vibrator units, each of 3-in. dia. The vibrator units are mounted on a bar lift, hydraulically controlled to permit raising the units to clear expansion joints. The vibrators operate at high speed—9,500 revolutions per min.—and are submerged in the concrete to the full 12-in. depth of the slab. One man operates the machine, which is propelled at speeds up to 22 ft.

(Continued on page 124)

Dependable construction made certain by Oliver Fasteners



Oliver Quality means faster assembly, better structures . . .

Develop the full joint efficiency and strength of your designs by specifying OLIVER bolts, nuts and rivets. These uniform, dependable fasteners—made to close tolerances—insure accurate fits and speedy assembly.

The Oliver line is complete in sizes and types. Materials include mild carbon and alloy steels. Special processing provides heat treatments, galvanizing or zinc plating when required.

Being one of the oldest and largest makers of industrial fasteners, Oliver has the equipment and experience to give you what you need. We will be glad to give you full data on modern fasteners for your particular applications.

OLIVER
IRON AND STEEL
Corporation

SOUTH TENTH AND MURIEL STREETS . . . PITTSBURGH 3, PENNA.

(Continued from page 122)

per min. by a fluid motor to provide a wide range of travel speeds.

The concrete mix, with a maximum slump of 2 in., was made with 5½ sacks of cement per cu. yd. and stone of 3-in. maximum size. Concrete placement was carried on at a rate of about 2,000 yd. per 10-hr. day. Handling 200 yd. of concrete per hr. the vibrating machine operated from 10 to 15 percent of the time concreting was in progress.

Personnel

The Consolidated Vultee Aircraft Corp. was represented on the joint project by T. W. Van Derveer, plant engineer, and the U. S. Navy was represented, during the design stages, by Capt. A. K. Fogg, public works officer, 11th Naval District, and, during construction, by Comdr. R. D. Thorson. The firm, Bowen, Rowe & Rule, was retained as consulting engineers for the project. Engineer in direct charge of the construction for Consolidated Vultee was John F. L. Bate. Concrete control was entrusted to the Smith-Emery Testing Laboratories. The $2,500,000 contract for the runway was let to Casson & Ball of Berkeley, Calif., who sublet the drainage contract to Artukovich Bros.

★ ★ ★

More Details on Construction of *Peru Hydro Plant*

(Continued from October issue)

Construction plans provide for an electrically driven compressor at each adit. From each compressor air will be piped to both headings, but tools and equipment to operate in only one of each pair of headings will be installed. Drilling will be done in one heading while mucking is under way in the adjacent one. The tools and equipment will then be loaded on a

(Continued on page 126)

(Continued from page 124)

car and shifted from one heading to the other in sequence as the drilling and mucking alternate. This procedure is feasible under existing local labor and other conditions.

Access to the work from the highway is obtained by a series of transportation cableways. Owing to the narrowness of the canyon, and the excellent anchorages obtainable in the solid granite walls, it is practicable to use these cableways to move all tools, supplies, and equipment across the gorge in specially designed buckets. Built with ample safety factors for loads of 3½ tons, the cableways also are used by all the labor and supervisors employed in driving the tunnel.

Excavation of the trails leading from the ends of the cableways along the face of the canyon walls to the tunnel adits has been a major operation. For much of the length of these trails benches had to be hewed out of the solid granite to a width of at least 6 ft., which is the minimum for safe movement to and from the adits. In one case it was necessary to rely on steps cut in the almost vertical face of the canyon. Since it is upwards of hundreds of feet from the trails almost

(Continued on page 128)

(Continued from page 126)

sheer down to the torrent below, no chances could be taken in providing these access trails.

To obtain power with which to operate the construction machinery and equipment, provide lighting and serve the camps and shops, a 1,000-hp. high-head hydroplant has been developed on a small tributary stream. A 28-in. steel pressure pipe, about 1,900 ft. long, carries this stream from a masonry overflow diversion dam to a powerhouse containing two 500-hp. Pelton water-wheel-generator units operating under 500-ft. head.

This installation is of permanent character and was designed to remain as a standby, as well as to contribute 750 kw. continuously to the main power system through suitable connection. At present the power is distributed 7 mi. down the canyon at 13,800 v., and reduced for local use at three locations to 2,300 v.

Construction Camps

Special attention has been given to the housing, sanitation and general welfare of the camps for the several hundred native workmen who are employed on the project. On account of the isolation of some of the adits, and of the diversion dam at the head of the tunnel, camps have been built on the sides of the canyon in these localities to house the men employed there. The main body of the employees, however, live in a central camp just below the mouth of the canyon.

At the only site available the surface was so steep that it was necessary to locate the buildings of the central camp on three separate levels. This arrangement permitted effective segregation of different groups of buildings. Permanent structures that will later be used for the operating staff of the project were placed on an upper bench. At this level are the homes of the supervisory staff, a hospital, a school house and the administration buildings. Dormitories, dining halls, bath houses and other general purpose buildings for the employees are situated on the second level. The shops and service facilities are at a third level directly below.

An ample supply of excellent water, a modern sewerage system, telephone, electric lights and other services for the camp are up to the best American construction camp standards. Native workmen, on their own initiative, built a large swimming pool. They also have constructed grounds for their native ball games and other sports. These camp facilities and a modern school have proved of great value in building up the morale and interest of the workmen who come from the most primitive and isolated mountain fastnesses. Important benefits

(Continued on page 130)

"MODERN EQUIPMENT serviced with Gulf Products makes short work of overburden"

says this strip mining Contractor*

"Gulf Quality Lubricants and Fuels help keep every unit on the job— and operating efficiently"

Our formula for fast stripping is modern equipment plus Gulf quality lubricants and fuels," says this Contractor.* "Proper lubrication and top-notch fuel performance help us avoid excessive wear and mechanical troubles, and contribute to smooth dependable operation of every unit."

Leading contractors on all types of earth-moving projects depend on Gulf lubricants and fuels to help them do a speedier, more profitable job. For they know that the use of quality petroleum products is one of the surest guarantees of efficient job operation and best insurance against breakdowns and mechanical troubles.

Call in a Gulf Service Engineer today and ask him to check over your equipment. He will recommend lubricants and fuels best suited to your particular equipment and operating conditions.

The services of a Gulf Engineer—and the Gulf line of quality products—are available to you through 1200 warehouses located in 30 states from Maine to New Mexico. Write, wire, or phone your nearest Gulf office.

*Keeley Construction Company, Clarksburg, West Virginia, has several large coal stripping contracts in Harrison County, near Clarksburg. Along with most other leading strip mining contractors in this high-tonnage district, this contractor is a hundred per cent user of Gulf quality lubricants and fuels.

GULF

GULF OIL CORPORATION • GULF REFINING COMPANY

GULF BUILDING, PITTSBURGH 30, PA.

(Continued from page 128)

have resulted from the well-equipped 30-bed hospital, where competent medical attention is provided.

Estimated cost of the entire hydroelectric project under the very economical local conditions that prevail is about $6,000,000, all of which is being financed by the Peruvian government.

Personnel

David Dasso, a Peruvian engineer who was educated in the United States, is head of Corporation Peruana del Santa, an agency of the Peruvian government which was organized in 1943. This agency is charged with the development of the hydroelectric project and other important works in the Santa Valley.

Barton M. Jones, an American engineer with wide experience in the control and development of stream flow, is engineer-director of the project. The work is being done by force account under Mr. Jones' personal direction, with the assistance of Engineer Raul Quinones, a Peruvian engineer, and Andrew M. Komora, who, prior to leaving the United States, was for nine years in responsible charge of different types of work on the Tennessee Valley Authority power development projects.

Fontana Dam

Part 1

(Continued from page 60)

found that the timber construction absorbs the vibration from the screens more satisfactorily than steel. A system of conveyors transports the raw material to the crusher buildings and from there takes it to the storage pile and sand plant. All material less than ⅞-in. produced by the short-head cone crushers is carried to a 500-ton-capacity timber bin where it is stored for use in making sand. Some of the plus ¼-in. size is first screened off to go to the fine rock storage.

Unsized rock from the crushing plant is taken by belt conveyor to the sizing screens adjacent to the stockpile. The material is passed successively from one set of sizing screens to another set. In order, the four sizes screened out are: cobbles larger than 3 in., 1½- to 3-in., ¾ to 1½-in. and ¼ to ¾-in. The screens discharge on to stackers which store the material over a timber reclaiming tunnel located in a ravine. Screening structures, as well as all conveyor supports and transfer points, are constructed entirely of timber.

Rod Mills

Minus ⅞-in. material stored in the 500-ton bin is reclaimed by two conveyors, each acting as a feeder to a rod mill. After careful tests to determine the best equipment, two rod mills, 9 ft. in diameter by 12 ft. long, were selected for making sand. In addition to unit costs and particle shape, consumption of critical metals was one of the determining factors in the selection of rod mills. It has been found that the metal consumption in the form of rods amounts to a little less than 1 lb. per ton of sand produced. The high silica content of the quartzite rock makes it very abrasive, as indicated by heavy replacements for screen cloth, crusher parts, and chute liners. Rods used in the mills varied initially from 2½- to 3½-in. diameter; they are replaced as required by 3½-in.-dia. rods. The wet process is employed, water being added at about 30 percent by weight of the feed material. The two mills together have a capacity of 240 tons per hr.

Product of the mills goes by gravity to a hydro-separator 16 ft. in diameter and from there to two rake-type classifiers, one 5x30 ft. and the other 7x30 ft. The removal of some minus 100-mesh material

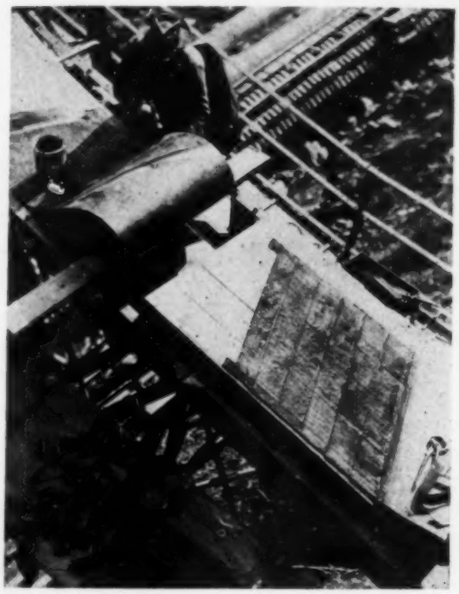
(Continued on page 134)

(Continued from page 132)

is effected in the hydro-separator, and some of the remainder and most of the water is removed by the classifiers. When discharged on a belt conveyor leading to the sand storage pile, the product has a moisture content of about 18 percent. The sand is further dewatered by standing in the storage pile; when it goes to the mixing plant, it has about 8 percent moisture content. About 15 percent of the rod mill feed is removed by the separator and classifiers as waste material, mostly minus 100-mesh.

Live storage in the storage piles over

(Continued on page 136)



FOR VULCANIZING SPLICE in conveyor belt, workmen carefully prepare belt ends. All splices are made by vulcanizing instead of using fasteners.

J. A. Gallagher, Madison, Wisc., contractor uses a Universal 546-P primary unit with 20" x 36" jaw crusher in Viroqua, Wisc. quarry. Plant is electric-powered.

Below: Beu & Sons use a 546-P primary unit with 20" x 36" crusher for primary reduction of limestone at Ackley, Iowa. Secondary plant has No. 4 Universal Pulverizer.

The 30" x 42" Welded Steel Plate Roller Bearing Crusher on this 546-P Primary Unit increases output for Art Overgaard's No. 1 plant at Cashton, Wisc. This is the third 546-P unit purchased by this operator.

Quarries step-up output with this UNIVERSAL Primary Unit!

These Universal Portable Primary Crushing Units greatly increase output for quarries because larger chunks of shot rock need not be rejected or sledged. In addition, they increase the output of secondary crushers by delivering material of a more uniform size to them.

Made in four sizes: 16" x 24", 20" x 36", 24" x 36" or 30" x 42" jaw crushers. Apron feeder empties onto bar grizzly with bypass chute for material suitable for secondary unit. Apron feeder can be readily detached and slid off onto a truck to facilitate hauling. Ideal for use with Universal 822-Q, 410-Q, 880 and other plants as well as *other makes* of quarry plants that need to be geared to tomorrow's requirements. Send for details.

UNIVERSAL ENGINEERING CORPORATION
327 8th St. West, Cedar Rapids, Iowa

ARMY NAVY

UNIVERSAL

CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS

Start Post-War Planning Now!

(Continued from page 134)

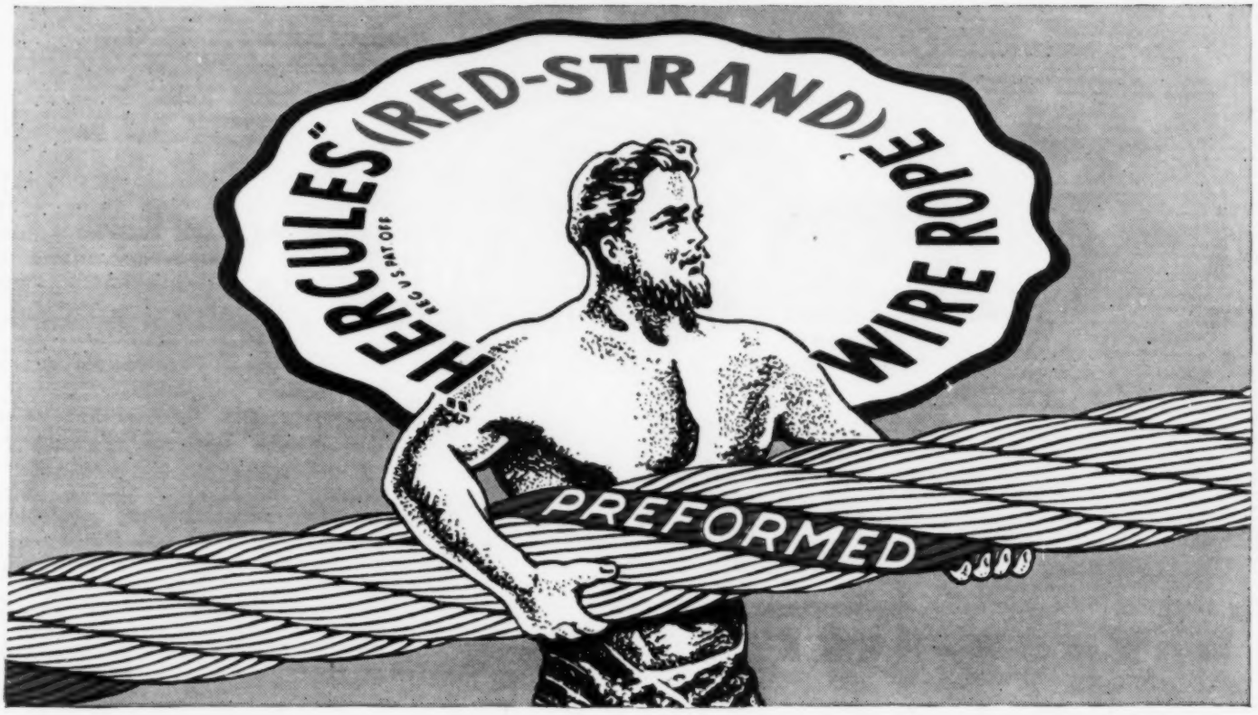
the reclaiming tunnel is about 40,000 tons in a total capacity of 100,000 tons. A belt conveyor in the tunnel carries the sized material across the river to rinsing screens, and other conveyors take it from there to the mixing plant. Hand-operated gates in the roof of the timber-framed reclaiming tunnel are manipulated by an operator on signal from a man in the headhouse of the mixer plant to keep the proper sizes of material constantly flowing to the mixer bins. Cobbles and large, medium, and fine rock are washed in the rinsing screens before going to the mixer plant. Sand is bypassed and not washed. Waste from these screens is reclaimed in the form of sand and is

STOCKPILE at end of conveyor suspension bridge from primary crushers provides about 10,000 tons of live storage for feeding to secondary crushers.

used for grout or returned to sand storage. Reclaimed sand amounts to as much as 100 tons per day.

Because of the high silica content of the rock, elaborate dust control methods are employed throughout the aggregate plant. Blasted rock is sprinkled in the quarry before loading on trucks, and a Rotoclone dust-collecting system is provided at the primary crusher and in each of the crusher buildings. The material is wet again at the sizing screens. Elimination of dust not only is necessary from a medical standpoint for the prevention of silicosis but is actually economical because of greater production from both men and machinery under improved working conditions. Dust collector systems are comparatively inexpensive for the results obtained.

PART 2 OF THIS ARTICLE, to be published next month, will describe the concrete plant and concreting methods and will name the men in charge of the Fontana project for the Tennessee Valley Authority.



ITS GREATER ENDURANCE MEANS BETTER VALUE. . . Preformed "HERCULES (Red-Strand) Wire Rope is designed and manufactured to do today's more difficult jobs quicker . . . better . . . safer . . . more economically. Properly selected materials, plus advanced manufacturing methods, plus the specific advantages of the preforming process are the factors which add up to its better value.

What are some of the specific advantages of the preforming process? Actual service records show the following:

1

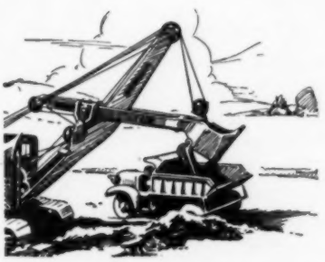
As broken wires lie practically flat, they are not so apt to injure the hands of men handling it. Also, there is less possibility of an "out of place" wire causing damage to adjacent wires in the rope.

2

It is not so easily kinked.

3

Its inert qualities make for smoother spooling and easier handling.



Important: **Preformed Wire is particularly efficient for use on:**
Backfillers—Bulldozers
Carryall Scrapers—Cranes
Draglines—Dredges
Dump Wagons—Hoists
Shovels—Skimmers
Trench Hoes

4

The preforming process minimizes the tendency of Lang Lay wire rope to loop or squirm.

5

There is less turning and twisting of the rope in the grooves, and less internal movement of the wires and strands—all of which tends to reduce both external and internal wear, thereby insuring longer service.

For *consistent* top-flight wire rope performance you can rely on "HERCULES". Let the Red-Strand be your guide. It is available in both Round Strand and Flattened Strand constructions in either the Preformed or Non-Preformed type. We shall be glad to help you select the right construction for your particular conditions.

MADE ONLY BY
A. LESCHEN & SONS ROPE CO.
WIRE ROPE MAKERS — ESTABLISHED 1857
5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK . . . 90 West Street
CHICAGO . . 810 W. Washington Blvd.
DENVER . . . 1554 Wazee Street

SAN FRANCISCO . . 520 Fourth Street
PORTLAND . . 914 N. W. 14th Avenue
SEATTLE . . 3410 First Avenue South

Welding Barge

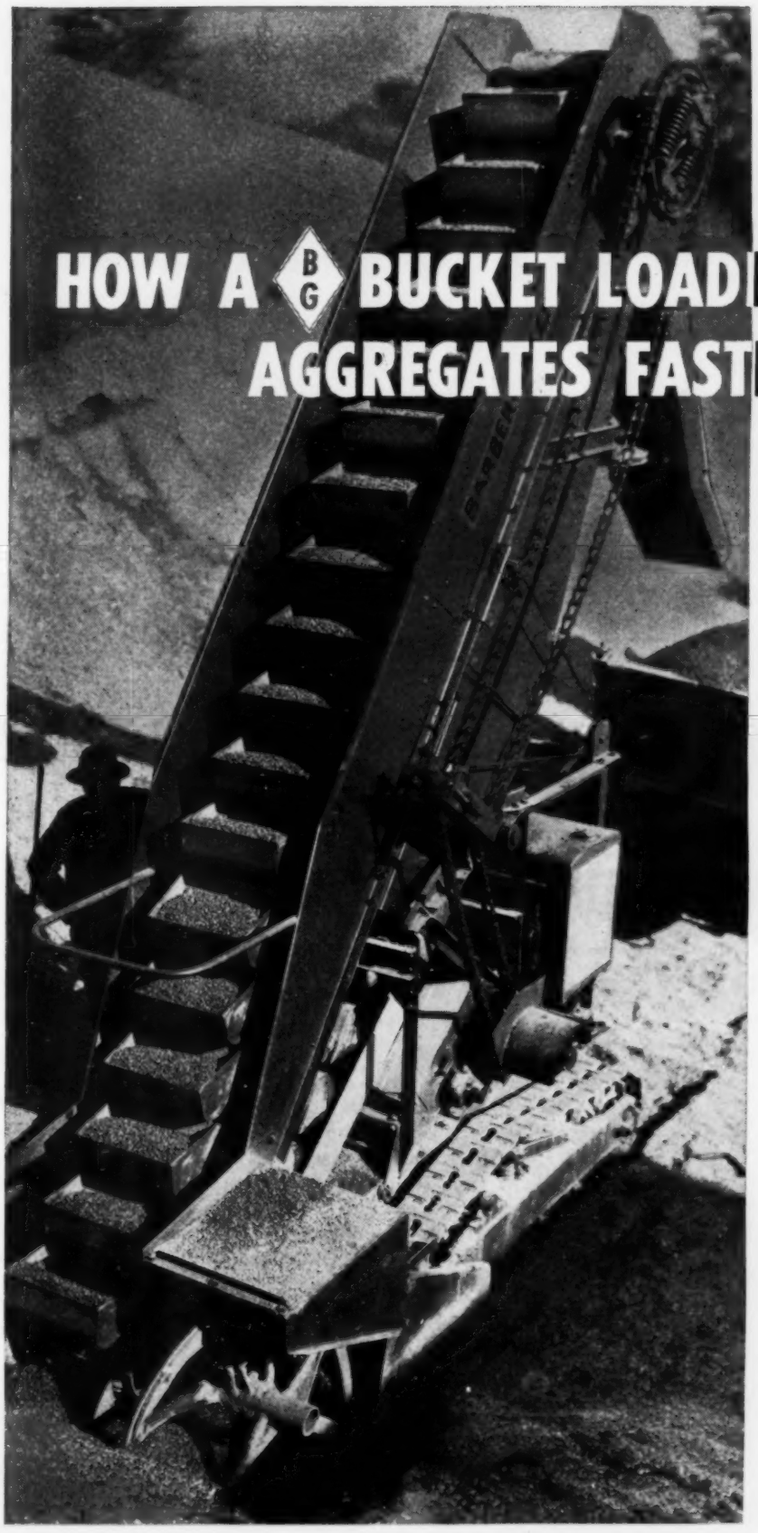
(Continued from page 83)

let stud for each welder. Electrode cables are extended from the outlet studs to the various welding positions. The welders are banked for ground bus connections, five machines to each bus, of 2,000-amp. capacity.

Central Control Panel

Welding operations can be kept under constant observation from a construction office which affords a full view of a central control panel. Four master ammeters and two master voltmeters indicate fluctuations in the main power supply. Blinker lights in a central panel show the number of welding machines which are operating. A bright light indicates that a welding machine is operating but not welding, a dim light indicates that the welding machine is in use by the welding operator. To the man in the construction office, the blinker panel gives a clear indication of the work fac-

(Continued on page 142)



HOW A B-G BUCKET LOADER HELPS HANDLE AGGREGATES FASTER AND CHEAPER

THIS versatile Barber-Greene Bucket Loader is a valuable job-coordinating unit in pit and quarry.

You can save money by processing aggregate at a uniform rate, even during "off" seasons, and storing it in stockpiles.

A Barber-Greene will reload it into trucks, whenever needed, at exceptionally low cost. In fact, many operators have found that the saving in truck time alone justifies its purchase.

Continuous handling by the B-G Loader is extremely advantageous in feeding material to processing equipment — screens, crushers, belt conveyors.

The B-G Bucket Loader also can be used for stripping, light excavating, screening, and many other cost-saving applications.

Full crawler mounting, tank type chassis, automatic overload release, synchronized spiral feeding, floating boom, centralized control, and 12 crowding speeds are but a few of the advanced mechanical features that give the B-G Loader long life and fine performance under the rigors of heavy, steady work. Consult your B-G representative or write the Barber-Greene Company, Aurora, Illinois.

44-28

Barber-Greene B G *Constant Flow Equipment*

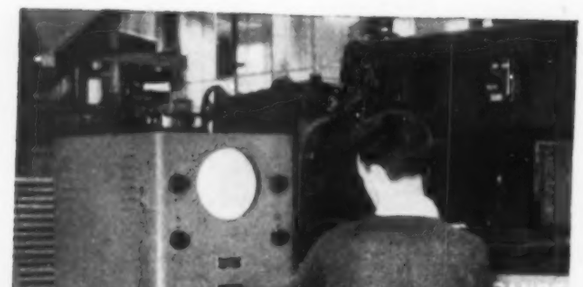
SHORTS STYMIED

Voltage surges which accompany switching and frequent starting and stopping of motors impose high dielectric stresses on the coil insulation, and can cause harmful short circuits. Yet this is an unavoidable condition of service for many motors.

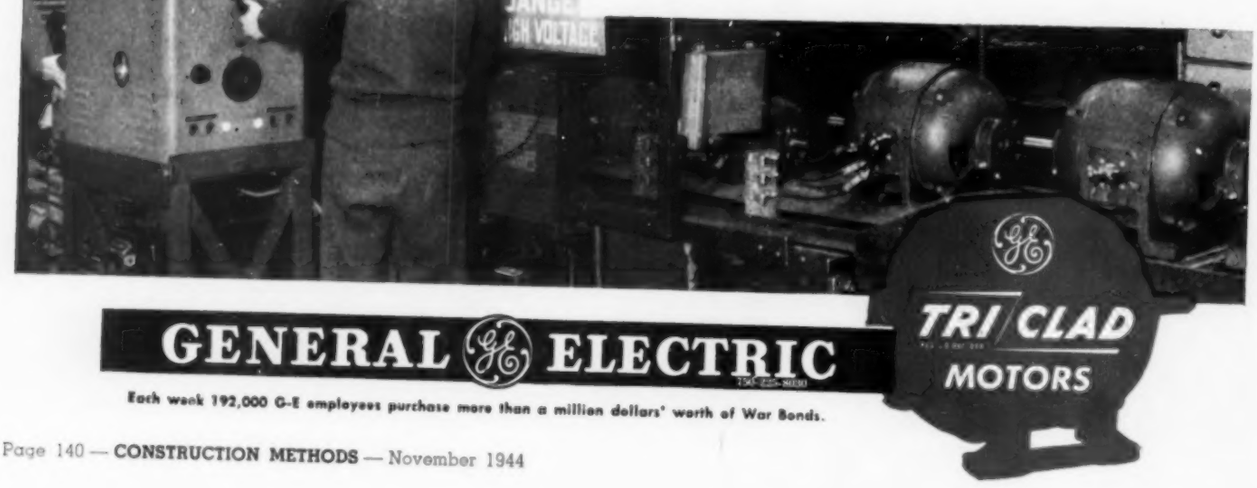
The grinder shown here, for example, starts and stops every time a finished part is removed and a new part inserted. But the two Tri-Clad motors that drive it have been built to withstand safely the voltage surges ordinarily encountered in this type of service. Their ability to "stymie" shorts was proved by *the new General Electric test* described below.

External grinder, equipped with two Tri-Clad motors, installed in the milk-machinery manufacturing plant of the Rite-Way Products Company, Chicago, Ill.

New high-potential, electronic surge-tester verifies strength of TRI CLAD motor windings



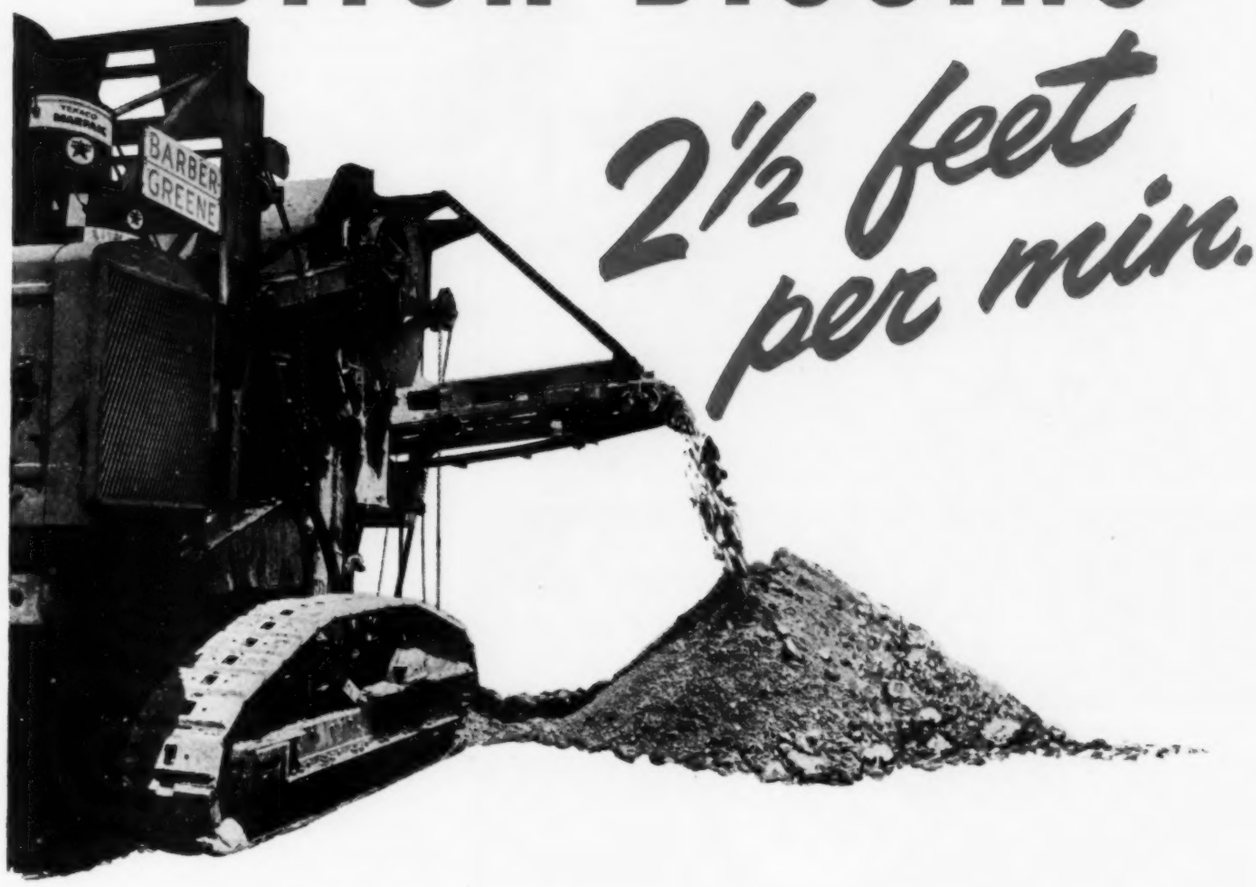
This electronic test of insulation makes a "cardiogram" of every Tri-Clad motor winding, ferreting out weaknesses that might lead to shorts caused by voltage surges in service. It tests each turn, coil, and phase group of the windings for adequate insulation strength to withstand the "steep front" high-voltage surges of actual service. First developed and applied by G.E., it's one of the production tests which all Tri-Clad motors must pass as they come off our production lines. – *General Electric Company, Schenectady, N. Y.*



GENERAL ELECTRIC

Each week 192,000 G-E employees purchase more than a million dollars' worth of War Bonds.

DITCH DIGGING



2½ feet per min.

ON EVERY fighting front, U. S. Engineers use this versatile Barber-Greene Ditcher to speed the digging of drainage ditches, sanitary and water lines, foundations, etc. Under average conditions, the Ditcher attains a digging speed of 2½ feet per minute—a stiff pace that can be maintained only with the help of *effective* lubrication.

On every construction job, equipment maintains the pace easier when effectively lubricated. And to more and more contractors today, *effective* lubrication means —Texaco.

Texaco Marfak, for example, used in your tractors, shovels, bulldozers, trucks, etc., provides ideal film lubrication inside a bearing, yet maintains its original consistency at the outer edges . . . sealing itself in, sealing out sand, dirt, water. Its tough adhesive film cushions bearings against road shocks. Makes parts last longer.

For wheel bearings, use *Texaco Marfak Heavy Duty*. It stays in the bearings—off the brakes. Seasonal repacking is no longer required.

Texaco lubricants have proved so effective in service that they are definitely preferred in many fields, a few of which are listed at the right.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States. The Texas Company, 135 East 42nd Street, New York 17, N. Y.

THEY PREFER TEXACO

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

TEXACO

TEXACO MARFAK

TUNE IN THE TEXACO STAR THEATRE EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

(Continued from page 138)

tor, or time employed in welding, of each welding operator.

For lighting and auxiliary power, the barge is equipped with two smaller Caterpillar diesel-electric sets, each of which incorporates an Electric Machine Mfg. Co. 15-kw. generator. Fuel oil is stored in two 2,500 gal. tanks below decks, with a 100-gal. auxiliary fuel tank mounted overhead on the top deck. The barge has a 1,080-gal. tank for lubricating oil and two 1,000-gal. water tanks. Loaded, the barge draws 5 ft. of water.

Welding Machine Ratings

Individual welding machines on the barge are rated 300 amp. and have a range of 60 to 375 amp., 40 v., continuous. Average setting of each machine in actual operation is about 200 amp., and the work factor, or time employed in actual welding, is 20 to 33 1/3 percent. For all the machines on board, instantaneous work factors as high as 75 percent are often encountered for from 3 to 10 min.

Current selection for each welding arc generally is made by the barge engineer in accordance with prearranged signals from the distant welding position. Self-indicating current dials on each machine enable the engineer to adjust the welding heat or current for each welding arc. The welding machines can be regulated in steps of 5 amp. or less according to the desires of the welding operators, and the voltage of the machine can likewise be individually adjusted.

Electrode Cable

About 35,000 ft. of stable arc electrode cable is stored in reels on the barge, each reel holding 500 ft. When the barge has tied up at the site of the work, the welding cables are unreeled and connected to the work outlet studs. The other end of each cable, carrying the electrode holder, is extended to the welding job, which may be 300 to 500 ft. from the barge itself.

Welding electrodes are allotted to the operators on a pound basis, and returned electrode stubs are carefully accounted for to be sure that the operator has used all the electrodes given to him. Weighing scales are installed in the stockroom to weigh both the electrodes and the returned stubs.

Operating Costs

Operation of the welding barge for one month consumes about 4,800 gal. of diesel oil at 10c per gallon and 96 gal.

(Continued on page 144)

NEW FEATURES...STARTLING PERFORMANCE ABILITY TO "TAKE IT"... MORE PORTABLE FASTER MIXING!

They're "go getters" when it comes to pouring yardage, durability and speedy portability. You can expect great IMPROVEMENTS in CMC post-war Mixers and you won't be disappointed.

More than a third of a century of "know how" plus a top record in building Mixers for Uncle Sam in the war years combine to bring you the kind of equipment you will need to handle the mass of POST-WAR WORK THAT'S WAITING. These new CMC's will come in all standard sizes.

GET ADVANCE INFORMATION NOW!

CONSTRUCTION MACHINERY CO.
WATERLOO • IOWA

Watch

For the Latest in

PUMPS . . MIXERS . . CONCRETE GUNS . . BATCHING AND PLACING EQUIPMENT . . HOISTS . . POWER SAWS . . CARTS AND BARROWS!

(Continued from page 142)

of lubricating oil at 60c per gallon, giving a monthly cost of $480 for fuel and $57.60 for lubrication. Assuming a normal operating time of 480 hr. for the month and distributing the cost among the 30 welding machines, the hourly cost per welder is $0.033 for fuel and $0.004 for lubrication, or a total of $0.037 per machine per hour for diesel oil and lubricating oil.

The welding barge was equipped and is now operated by the Master Welding Service Co., New York, of which Joseph Babovsky is president. Charles E. Dell, New York, was consultant on the design of the floating welding unit.

★ ★ ★

Steel Sheetpiling Protects Railroad Fill

(Continued from page 81)

for 300 or 400 ft. at the top of the slope. Continuous storms developed additional washouts in the fill and along the entire beach. Measures to prevent any recurrence of the damage were promptly undertaken by H. A. Cassil, chief engineer for the railroad, and O. E. Hager, engineer of bridges and structures, who had been in direct charge of planning and job supervision. Thus, a comparatively small original project rapidly grew until close to $1,500,000 is now estimated to be the final cost of the construction. Completion is tentatively set for Nov. 1, 1944. The Jutton-Kelly Co., contractor for the extended project, is now employing a maximum of 50 men, six days a week, 9 hr. per day.

Danger of washouts caused by rainwater pouring down the deeply eroded 30-ft. bank on the offshore side of the tracks is guarded against by 3,650 ft. of corrugated steel sheeting, driven along the offshore trackway shoulder, and by the drainage ditch between the bank and the sheeting. At five points along the fill where the washouts had indicated the heaviest flow of surface water, the project called for installation of five culverts, consisting of two 48-in.-dia. reinforced-concrete pipes, one 48-in. cast iron, one 24-in. cast iron and one 24-in. reinforced-concrete pipe, designed to

(Continued on page 146)

Typical of the exhaustive field tests which marked the development of the modern, high speed Cummins Diesel, was the gruelling 14-day grind which came to an end on Christmas Day, 1932, at the Indianapolis Speedway. Here, under AAA supervision, a Cummins-powered Indiana truck set a non-stop distance record for trucks: 14,600 miles (5,840 laps of the 2½-mile oval!).

The injector cup wiper is an inconspicuous part of the Cummins Diesel, but its development made a conspicuous contribution to the Cummins Diesel's efficient and economical performance. This patented cup wiper, perfected only after countless modifications in piston design, eliminates carbon on the injector cup, creates additional turbulency, assures more complete combustion.

Metallurgy plays an important role in the Cummins Diesel trend to ever lighter, stronger construction. Example: 5,000 samples were analyzed in selecting the cast iron for the block—a foundry was rebuilt and its methods completely revised—but the increase in tensile strength from 20,000 to 50,000 pounds per square inch more than justified the cost.

CUMMINS DEPENDABLE DIESELS

Automotive Models: Designed for all types of heavy-duty trucks in either highway or off-the-highway service.

★ ★ ★

Industrial Models: Portable and stationary engines, power units, and generating sets for service in any industry requiring heavy-duty power.

★ ★ ★

Marine Models: Propulsion engines and marine type generating sets designed for all types of fishing boats, work boats, and pleasure craft.

Spade Work

The diesel's higher thermal efficiency was proved many years ago . . . but it took the builders of Cummins Diesels to prove that diesel engine weights and dimensions could be brought within practicable limits. They proved it in 1932 with the original high speed diesel . . . proved it after 14 years of intensive "spade work" in the refinement of lubrication, cooling, metallurgy and many other aspects of design and construction . . . proved it by putting diesels in equipment and on jobs where diesels had never worked before. Today, you will find diesels in virtually every automotive, industrial, and marine service that requires heavy-duty power . . . and if you look closely enough, you'll find a very large proportion of those diesels are Cummins Dependable Diesels.

CUMMINS ENGINE COMPANY, INC., Columbus, Ind.

(Continued from page 144)

carry all hillside runoff underneath the tracks. At the pipe inlets are square 5x5-ft. concrete catch basins. The steel sheeting of the cutoff wall is embedded in concrete headwalls to form an unbroken barrier.

To carry culvert discharge down the slope, open box-type timber flumes were constructed on 12-in. hardwood piling driven to 35-ft. depth in order to take

DURING NOON SHUTDOWN, 4-ton locomotive and operator take time out for lunch. Special sling for picking up dump cars hangs from crane boom in background.

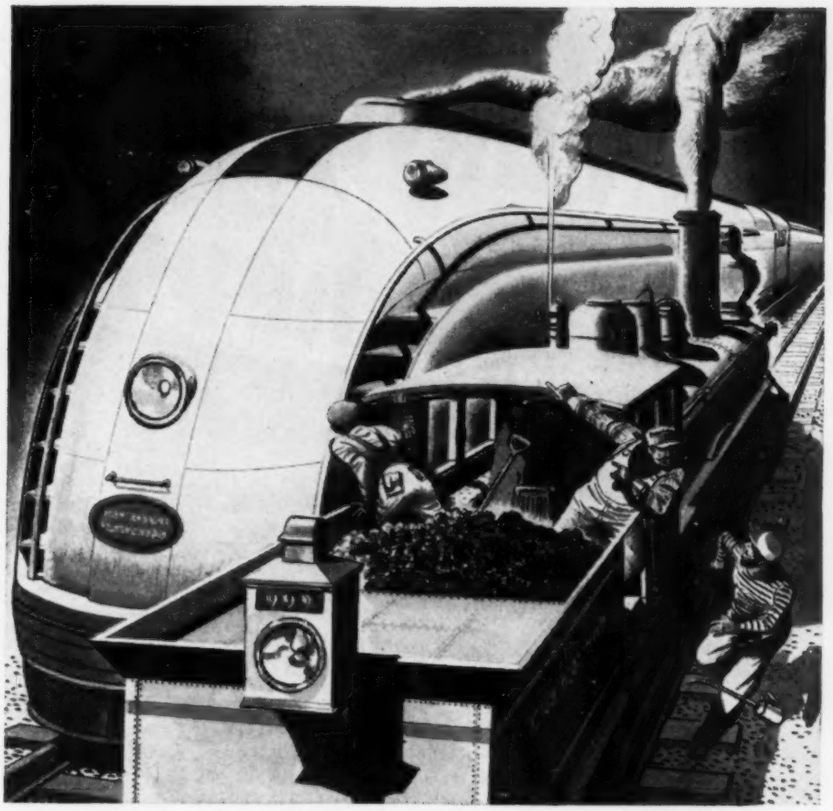
a firm grip below the old fill material. The boxes, which measure 6x6 ft. at the 48-in. pipes and 5x4 ft. at the 24-in. culverts, are of rough oak timber with 4-in. flooring covered with 20-gage steel sheathing salvaged from wrecked boxcars. Sides are built of 2-in. boards, strengthened by 6x6-in. side bracing. Where the flumes cross a construction road along the beach, removable box sections, equipped with hooks in the sides, can be lifted to clear the road for traffic in case of future repairs on revetment walls.

Cutoff sheeting along the track is Caine Steel Co. 8-gage standard interlocking type, 11/64 in. thick, 14 3/16 in. wide, weighing 11.7 lb. per sq. ft. Driven to 6-ft. penetration, the 8-ft. sheeting provides 2 ft. of freeboard.

T-section piles were driven in the cutoff wall every 18 ft. The T-section pile was made by welding a stiffening rib

(Continued on page 148)

THERE'S BEEN A BIG CHANGE



★ For years old "999" was undisputed champion of locomotive design and performance. But she couldn't keep up with progress.

For years nobody challenged the efficiency of the conventional tapered roller bearing, either—until transportation and industry heaped increasing burdens on bearing service.

It's the rollers that carry the load. And Tyson found the way to add more load-carrying rollers around the raceway. Result: a sturdier, longer-lasting heavy-duty bearing.

* * *

The Tyson "All-Rolls" design is leading the progress parade by doing many tough jobs better—and lasting longer—than bearings with fewer rollers. *The big name in bearings today is* **TYSON!**

TYSON BEARING CORPORATION · MASSILLON, OHIO

COUNT THE ROLLS · THE ROLLS COUNT

Tyson

TODAY'S HEAVY-DUTY BEARING

★ BUY MORE WAR BONDS ★

(Continued from page 146)

12 ft. in length, extending 4 ft. below the sheeting, to the back of the sheetpile. Each stiffening rib, welded to the back of a pile, consisted of a half-width of standard corrugated sheet 12 ft. long.

Because of the inexperience of using steam cranes along the railroad tracks, McKiernan-Terry No. 3 hammers operated with air were used to drive the sheeting. Two air compressors, a Worthington and a Schramm, with 80 to

TIMBER FLUMES lined with salvaged 20-gage steel sheet carry surface water down slope to beach. Portable sections at end are removed to allow construction traffic along beach.

105-psi. pressure and 110-cfm. capacity, were joined to one receiver. For driving the corrugated piles, the contractor used a special heat-treated cast-steel cap which fitted snugly over the corrugations and prevented battering of the tops of the sheets. The driving hammer was suspended from a specially built tripod constructed 10 ft. high to provide working headroom above the 8-ft. piling. One crew of four men set and drove sheetpiles for an average of 75 to 100 ft. of cutoff wall per day in the sand-clay material.

Sheetpile Bulkhead

For the bulkhead wall at the base of the fill along the lake shore, ⅜-in. hot-rolled arch web steel sheetpiling was driven along the area of the heaviest washouts for about 1,700 ft. A northern extension of the bulkhead, about 1,300 ft. in length, consists of standard interlocking 8-gage corrugated steel pil-

(Continued from page 150)

QUICK QUIZ FOR CONSTRUCTION MEN

One of these Answers May Help You Lower Your Maintenance Costs!

Q **Is there a way to add "M. P. T."* to machines?**

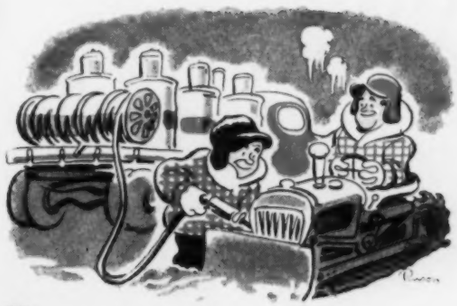
A There sure is. It's an Alemite Portable Service Station. Here's a typical performance: Time was being lost on 5 machines through slow lubricating methods. With the Alemite Portable Service Station, power lubrication was brought "on the job." Lubricating time was cut 50%—gaining 100 minutes "M. P. T." per day. The savings in time, maintenance and machines paid for the new method in a short time. Are you interested in adding "M. P. T." to your machines?

**More Productive Time*

Get Set for Winter With "On the Job" Power Lubrication With An Alemite Portable Service Station

This complete power lubrication department on wheels carries lubricants to machines on the job. Developed by Alemite, the unit includes high-and-low pressure Alemite Barrel Pumps, Alemite Motor Oil Dispenser, hose reels and gas engine air compressor.

It's the sure way to fight ruinous winter friction and costly shut-downs and it is proving itself on thousands of construction jobs. Write for catalog. Alemite, 1840 Diversey Parkway, Chicago 14, Illinois, or Belleville, Ontario.



Q **Can track roller bearing wear be reduced in winter?**

A Of course! One contractor was having an epidemic of track roller bearing failures. He decided to use "on the job" power lubrication. Track roller and other bearing expense dropped 25%. Shut-down time was saved and put back into production. Consumption of lubricants dropped almost 20%! Say! have you checked up on your lubrication methods lately?

Q **Will your greases and oils "take it" this winter?**

A It all depends on whether they're Alemite's. You see, Alemite builds extra-wide operating range into all of its greases and oils. The result is amazing toughness and free-running qualities that fight friction in the coldest weather! Alemite "Sub-Zero" lubricant, for instance, is designed for heavy-duty cold weather work—*actually protects bearings down* to 40° below! Does that kind of performance sound good to you?

WANTED

Tough Job by Man with "MML" Degree!

This man, an Alemite Lubrication Specialist, is a "Master of Modern Lubrication." His technical training, skill and experience equip him to come on your job and consult with you about applying the most modern lubricating methods. He has added more productive time to machines, saved lubricants and man power. He has installed safer, surer, more accurate lubricating methods.

He's ready to go to work for you now, backed by the world's most experienced organization in the handling and application of lubricants. Call him. Or, if you prefer, write Alemite for the address of the nearest Alemite Lubrication Specialist.

Another Product of STEWART WARNER

ALEMITE *First in Modern Lubrication*

REG. U. S. PAT. OFF.

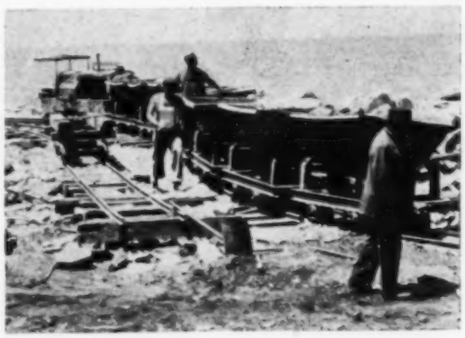
CONSULTATION • ENGINEERING • EQUIPMENT • LUBRICANTS • MAINTENANCE

(Continued from page 148)

ing. As previously stated, both types of piles are 16 ft. long, driven to 10-ft. penetration. In the portion constructed of corrugated steel sheeting, stiffening ribs, similar to those used in the upper cutoff wall on offshore side of tracks, were spaced every 18 ft.

At intervals of 125 ft. along the heavier bulkhead sheeting, wing walls of ⅜-in. sheetpiling were driven 20 ft. inshore from the bulkhead to the row of 12-in. creosoted timber anchor piles, installed on 4-ft. centers and braced with horizontal wales. This arrangement of steel sheetpile walls and timber piles formed bins with dimensions 20x125 ft.

Rock used in the bins and jetties was transported by train from Quarry, Mich., to a construction side-track along the lake side of the fill. Unloaded at the south end of the project, where the bluff is steepest, by a Manitowoc gasoline crane with a 1¼-yd. clamshell bucket, the rock rolled down the steep hillside to the beach. Here two Bucyrus-Erie steam cranes, a 41-B and a 30-B, equipped with 1¼-yd. Owen clamshell buckets, pick up the stone and load it into dinkey trains made up of Blaw-Knox side-dump cars of 1½-yd. capacity operating on a 24-in. narrow-gage track constructed along the beach. Two Plymouth locomotives, a 7-ton and a 4-ton, are used with a total of 12 cars to haul the rock to its destination. After being disconnected from the train, the cars are picked up with a special sling by a Lorain crane and are discharged into the designated fill area.



ROLL-OVER DUMP CARS of 1½-yd. capacity haul rock along beach to be placed in required areas. This train is powered by 7-ton locomotive.

For 700 ft. at the south end of the job, 21,000 tons of riprap from Quarry was placed along the shore to give added protection against the waves in that locality. Rows of timber piling form pockets for the riprap.

In previous attempts to prevent lake

(Continued on page 152)

Our troops go ashore from a landing barge to engage the enemy.
ACME PHOTO

Wire Rope goes wherever our land, sea and air forces go. To carry the fight to the enemy, their supply of rope must constantly be renewed and expanded. You tell them, "Here ... use some of mine," every time you get along with fewer new ropes. The suggestions below, *if followed,* will help you conserve wire rope ... and time ... and manpower ... by making each rope installation deliver maximum service:

1. Use preformed rope wherever possible. It handles more easily ... requires a shorter breaking-in period ... resists kinking and bending fatigue ... protects men and equipment from broken outer wires.

2. Instruct operators in correct practices. Wire rope life is in their hands. By avoiding overloads, jerking, too fast acceleration and excessive speeds ... by watching drums and sheaves for conditions that cause rubbing, nicking or pinching ... the operator may double the service of a rope.

3. Lubricate wire rope faithfully. Think of those endless grooves between wires and strands as oil holes through which the moving wires and hidden core must get sufficient lubrication to minimize friction and wear. Rust and corrosion attack rope parts whether working or waiting, unless you provide a protective coating.

And team up ropes that give uniform service. *Preformed* Yellow Strand Wire Ropes work smoothly together because they are engineered to the same standards of efficiency and durability. Teamed further with Yellow Strand Braided Wire Rope Slings, they take a lot of the headache out of wartime material handling. Our Industrial Wire Rope Hand Book and Riggers' Hand Book contain many practical pointers. Send for either or both ... today.

Broderick & Bascom Rope Co., St. Louis

Branches: New York, Chicago, Houston, Portland, Seattle
Factories: St. Louis, Seattle, Peoria

YELLOW STRAND
PREFORMED WIRE ROPE

(Continued on page 150)

waters from undermining the fill, the railroad twelve years ago drove 1,550 ft. of ⅜-in. deep arch web steel piling 18 to 20 ft. in length to 16-ft. depth about 50 ft. out from the shore and five years ago reinforced this wall. It was on the extension and repair of this breakwater that men were working in 1943 when the storm carried away part of the old fill and tore out some of the old piling. The breakwater in the lake now has been lengthened to more than 4,200 ft., including the 1,550 ft. of original ⅜-in. steel wall, which was pulled back and straightened. Piling in the extension is also ⅜-in. steel, deep arch section, driven with No. 7 McKiernan-Terry hammers operated by Bucyrus-Erie steam cranes.

In straightening the original wall, a water jet was used to loosen the sheeting and the wall was pulled back with a five-part cable block and fall, bridled to the

DIESEL TRACTOR pulls steam hammer on utility sand sled to equipment yard.

sheeting and attached to fairway leads of a Bucyrus-Erie steam crane, blocked behind the anchor piling. All torn metal of the original wall was repaired by welding.

As previously mentioned, two rows of creosoted timber piles were driven between the bulkhead and breakwater. The outer row, 10 to 20 ft. from the breakwater, has piles on 4-ft. centers; in the other row, 20 ft. further inshore, piles are spaced on 12-ft. centers. Steam cranes operating No. 1 and No. 2 Vulcan hammers drove the piles, which are tied together in separate rows by 12-in. horizontal wales of hardwood timber.

Steel ⅞-in. tierods are used to connect the two rows of piles, and 1¼-in. rods anchor the sheetpile breakwater to piles in the outer row. The latter rods are attached at the back of the sheetpile wall to a wale of 10-in. and 15-in. channels welded to the back of the sheeting. Nuts on all rods and bolts are welded to pre-

(Continued on page 154)

TELSMITH

CRUSHING AND SCREENING PLANT

U. S. Army Engineers are building a huge dam in Tennessee. It will require 1,500,000 tons of aggregate—4 sizes of crushed rock: 3″-6″, 1½″-3″, 3/16″-¾″, minus 3/16″; and one size of sand.

To produce this material, Ralph E. Mills Co., of Roanoke, Va., opened a quarry at the dam site. The rock is a high calcium limestone. Telsmith designed the complete crushing and screening plant, and furnished most of the equipment. Capacity is in excess of 200 tons per hour.

On war jobs, equipment as well as men must produce more *and faster* without "cracking" under the strain. For years Telsmith has been building equipment that can turn it out, without taking time out. Telsmith complete sand and gravel and rock crushing plants are a *known quantity* to miners, contractors and aggregate producers.

That's why Telsmith gets the call on so many war jobs—to build army and navy air bases, dry docks, roads, dams, and other big construction projects.

That's why your Uncle Sam is now taking most of the Telsmith equipment being built. It's going overseas, to build for the armed forces' needs.

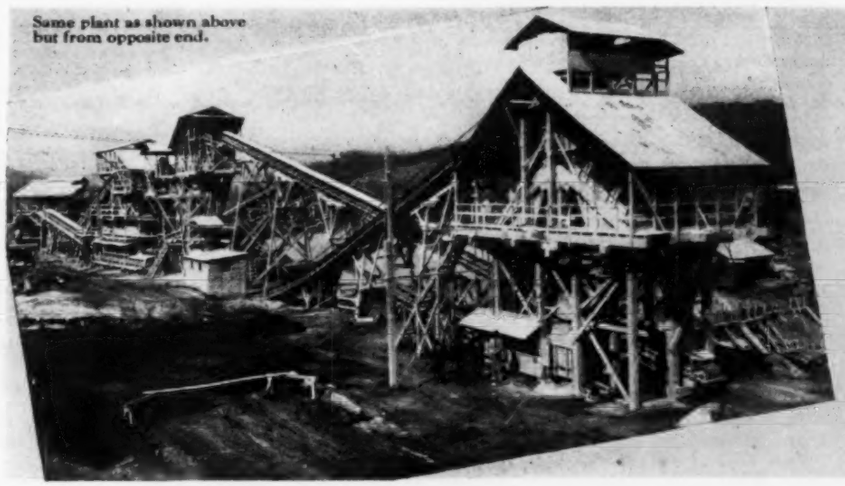
You can get Telsmith equipment—for war work now—and after the war for all your needs. Get Bulletin Q-10 today.

SMITH ENGINEERING WORKS, 510 E. CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

Cable Addresses: Sengworks, Milwaukee—Concrete, London

Q-9

51 East 42nd St., New York 17, N. Y.
211 W. Wacker Drive, Chicago 6, Ill.
713 Commercial Trust Bldg., Philadelphia 2, Pa.
247 Third St., Cambridge 42, Mass.
Bochck Eqpt. Co., Milwaukee 3, Wis.
Mines Eng. & Equip. Co., San Francisco 4—Los Angeles 14
Brandeis M. & S. Co., Louisville 8, Ky.
Rish Equipment Co., Charleston 22 & Clarksburg, W. Va.
Rish Equipment Co., Roanoke 7 & Richmond 10, Va.
North Carolina Eqpt. Co., Raleigh & Charlotte 1, N.C.
Wilson-Weesner-Wilkinson Co., Knoxville 8 & Nashville 6, Tenn.


Same plant as shown above but from opposite end.

TELSMITH
Quarry Plant Equipment

One 48″ x 12′ Telsmith Heavy-Duty Apron Feeder
One 36″ x 180′ Telsmith Belt Conveyor
One 48″ x 7′ Telsmith Plate Feeder
One 36″ x 182′ Telsmith Belt Conveyor
One 16-B Telsmith Primary Breaker
One 24″ x 78′ Telsmith Belt Conveyor
One 24″ x 75′ Telsmith Belt Conveyor
One No. 48 Telsmith Gyrasphere Secondary Crusher
One 36″ x 131′ Telsmith Belt Conveyor
Two 4′ x 12′ Telsmith Double Deck Pulsator Screens
Two 18″ x 21′ Telsmith Belt Conveyors
Two 4′ x 10′ Telsmith Single Deck Pulsator Screens
Twelve Telsmith Bin Gates
Three 18″ Telsmith Belt Conveyors
One 18″ x 105′ Telsmith Belt Conveyor

(Continued from page 152)

vent turning. The job used three electric arc welding machines, one General Electric 200-amp. and two Hobarts, a 400-amp. and a 300-amp.

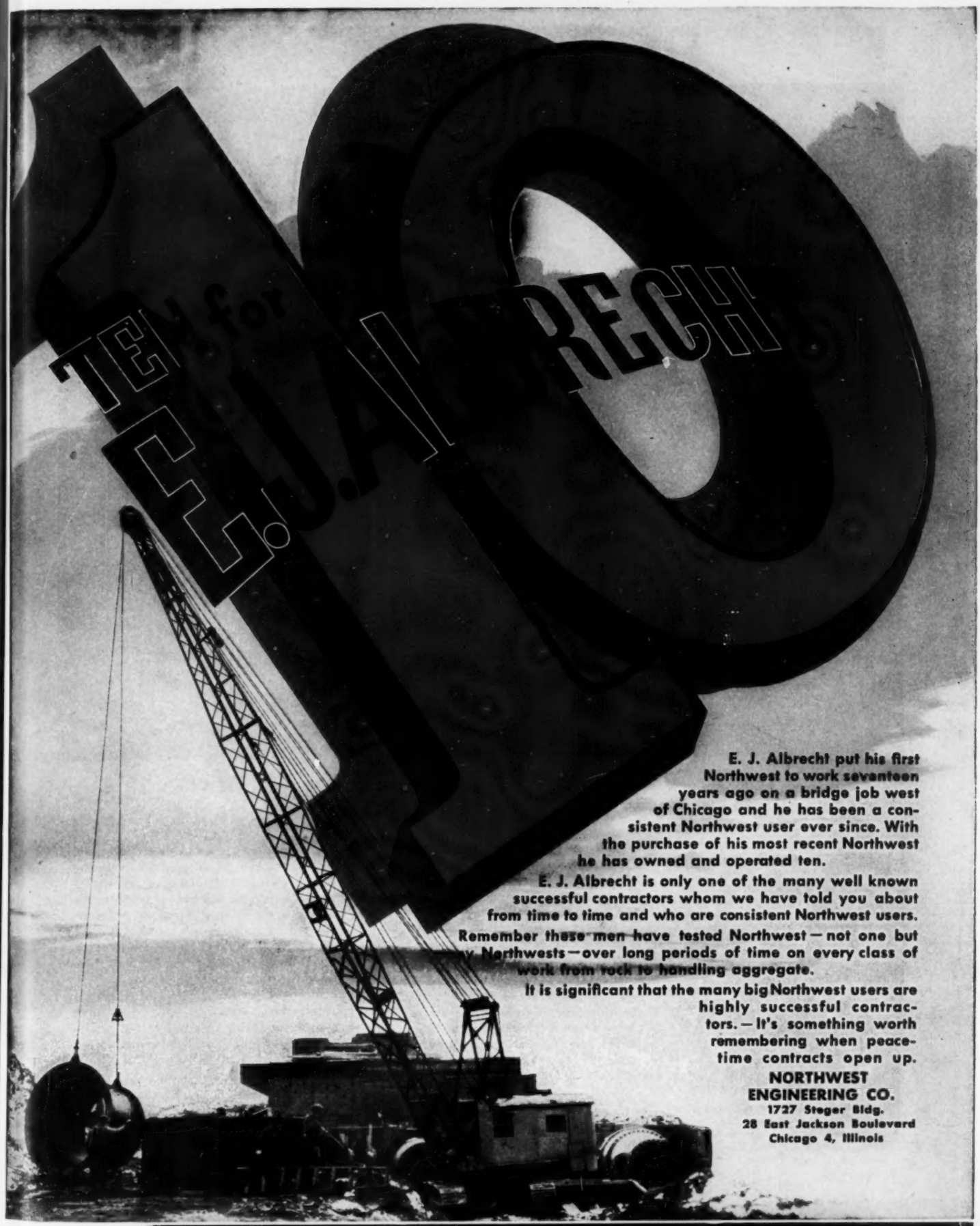
Rock-Filled Pile Jetties

When washouts damaged the shore line in the 1943 storm it was necessary to construct a total of nine jetties to aid in building up the beach. Three of the jetties, spaced about 100 ft. apart, are at the north end of the project, five are at about the center, also spaced 100 ft. apart, and one is constructed at the south end where the riprap protection makes a junction with the sheetpile walls. The jetties are 16 ft. wide, have a 9-ft. average height of riprap fill, and are of various lengths. Two at the extreme north end start from a point 45 ft. outside the breakwater and extend about 35 ft. inshore from the sheetpile wall to the second row of anchor piles. The third jetty starts about 45 ft. outside the breakwater and extends

CLAMSHELL BUCKET of 1¼-yd. capacity deposits rock in jetty.

inshore to the bulkhead wall at the shore line. Approximately 800 ft. farther south the fourth jetty is built from a point 45 ft. outside the breakwater back to the breakwater only. The fifth, sixth and seventh jetties start about 40 ft. outside the breakwater and extend inshore to the bulkhead. No. 8, the last jetty in the center section of the project, is 35 ft. in length, extending outshore from the breakwater. At the extreme south end of the sheetpiling wall, No. 9 jetty starts from a point 40 ft. outside the break-

(Continued on page 158)



E. J. Albrecht put his first Northwest to work seventeen years ago on a bridge job west of Chicago and he has been a consistent Northwest user ever since. With the purchase of his most recent Northwest he has owned and operated ten.

E. J. Albrecht is only one of the many well known successful contractors whom we have told you about from time to time and who are consistent Northwest users.

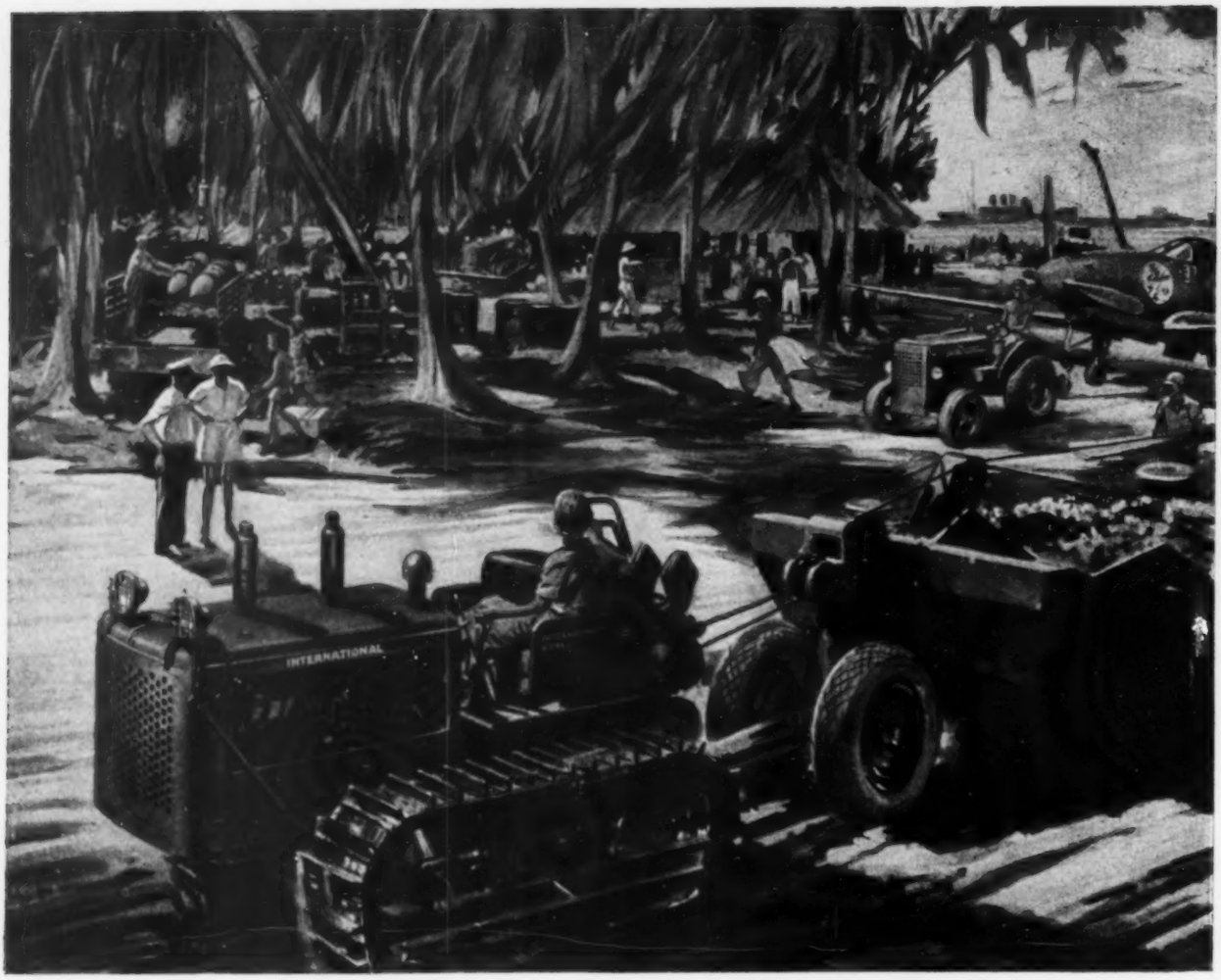
Remember these men have tested Northwest — not one but Northwests — over long periods of time on every class of work from rock to handling aggregate.

It is significant that the many big Northwest users are highly successful contractors. — It's something worth remembering when peacetime contracts open up.

NORTHWEST ENGINEERING CO.
1727 Steger Bldg.
28 East Jackson Boulevard
Chicago 4, Illinois

NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS



TO 18,310 HARVESTER SERVICE STARS

OUR JOB TODAY

Let's all remember that our job today is to fight harder on the home front . . . fight on the food front . . . give to the blood bank . . . buy extra War Bonds . . . fight inflation . . . for VICTORY.

HARVESTER men-at-war, like all America's fighting men, go where duty calls them. They fight on every front—on land, at sea, and in the air. There are 18,310 of them, and many have already given their lives for their country.

Many of them fight with machines they once helped to build. Take those big International Diesel Crawlers that have advanced with the first waves of attack onto many an invasion shore. Often it's a soldier of Harvester on an International machine. . . . He drives that weapon with confidence and pride. He has reason. He has had a share in the making.

In the jungle scene above are other International machines that fighting men are guiding in the face of enemy fire. Wheel tractors to maneuver the planes—crane tractors to bring them bombs—Diesel units for lighting and power—and those peacetime sluggers that double as secret weapons, the "bulldozers." It takes plenty of this equipment to secure the beachheads, to build the landing strips, to rout the enemy from his defenses.

Firepower, machinepower, and *manpower* make up the might of America's armed forces . . . these things and *the spirit* and *the will.*

Harvester is proud of its own multiple share in the nation's war effort, but proudest of its fighting men in the armed forces. In the windows of Harvester's home front there are 18,310 service stars to hold us to a DUTY that will not be discharged until the Victory is won.

HARVESTER

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

INTERNATIONAL HARVESTER

Power for Victory . . . Power for Peace

From steel making to rope laying...we never forget this fact...that pound for pound, wire rope has more bearing surface than any other piece of equipment. That's why you can depend on...

WHAT can you expect from Roebling? Rope that has known capacity to deliver service. Engineering, in our plant and at your job, to put the rope to work right. Maintenance practices that protect its long life. Your postwar profits and postwar jobs will depend in part on operating rope-rigged equipment at lowest cost. You can leave that part to Roebling.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

Wire Rope and Strand • Fittings • Cold Rolled Strip • Aircord, Swaged Terminals and Assemblies • Round and Shaped Wire Wire Cloth and Netting • High and Low Carbon Acid, and Basic Open Hearth Steels Suspension Bridges and Cables • Electrical Wires and Cables • Aerial Wire Rope Systems

ROEBLING

PACEMAKER IN WIRE PRODUCTS

(Continued from page 154)

water and extends inshore for a total of about 140 ft. to the toe of the embankment.

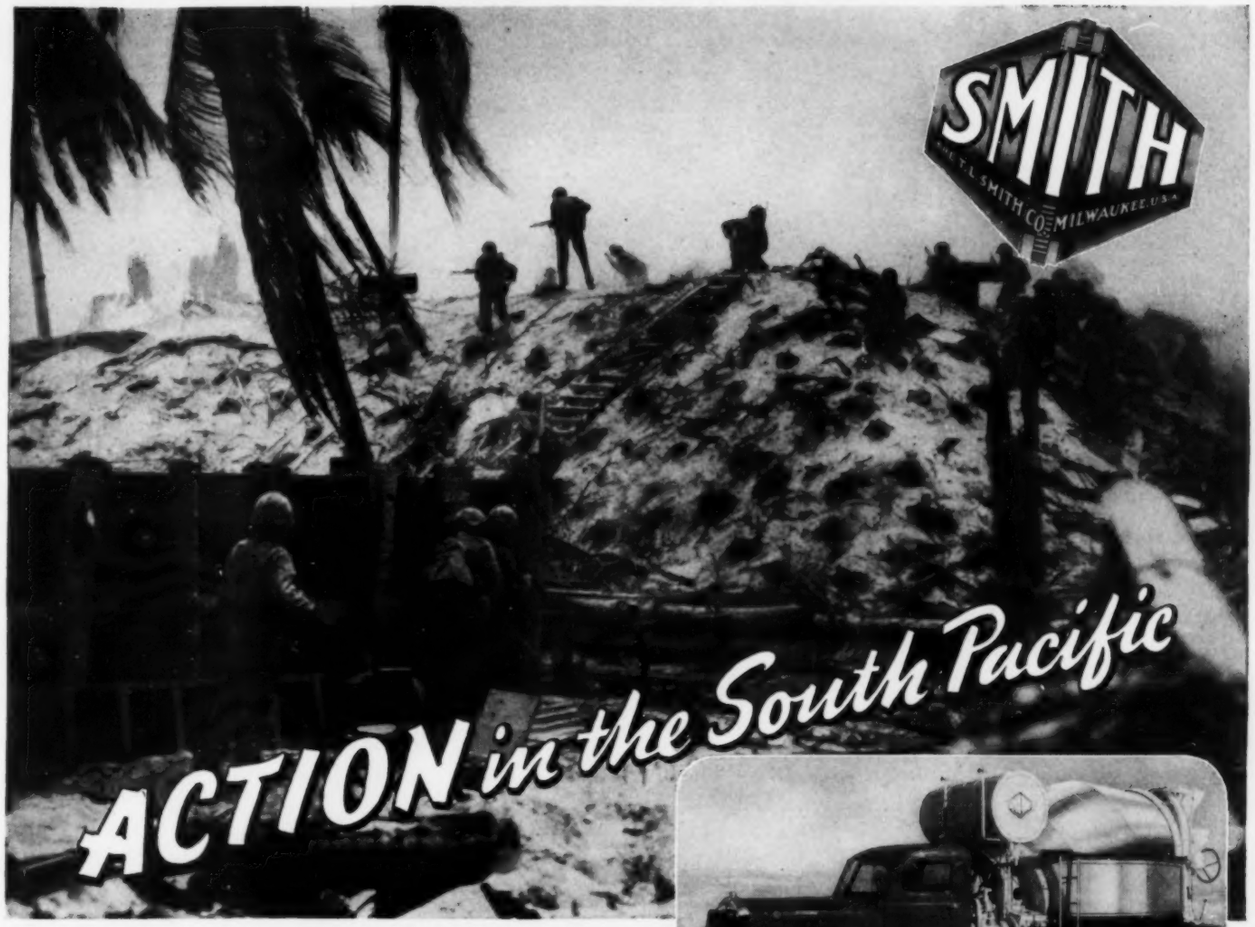
Around the periphery of each jetty, double rows of 25-ft. timber piles, driven to 20 ft. on 2½-ft. centers, staggered in the two rows, with timber wales bracing each row, support the jetty walls. A single row of piling is driven across the face of each jetty 8 ft. back from the jetty nose, and braced by a pile wale. Each jetty is also furnished with three transverse tierods and struts, equally spaced. Outside the breakwater, walls to retain the rock fill were constructed by placing

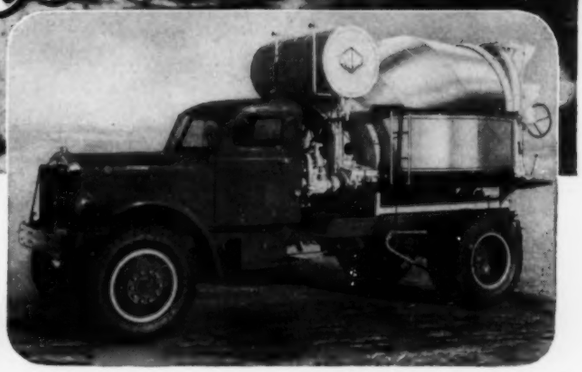
BEFORE STARTING FILL. 1-yd. dragline builds first of two terraces 10 ft. wide, one-third way down slope. Second bench will be at two-thirds point.

precast concrete blocks 15x15x36 in. in size between the timber piles, and a row of deep arch web sheetpiling was driven outside the timber piles, next to the timber wales, and across the jetty nose. Around the sections ouside the breakwater, about 6 ft. distant from the steel sheetpiling, another row of timber piles, 15 ft. in length, was driven on 2½-ft. centers to a depth allowing 1 ft. of freeboard above the water surface. At several designated points inside the breakwater, where additional strength was desired, jetty walls were constructed of precast concrete blocks, similar to the outside walls, to hold rock fill. All blocks for the walls were cast on the job, a Smith 27E paving mixer supplying the 950 cu. yd. of concrete required.

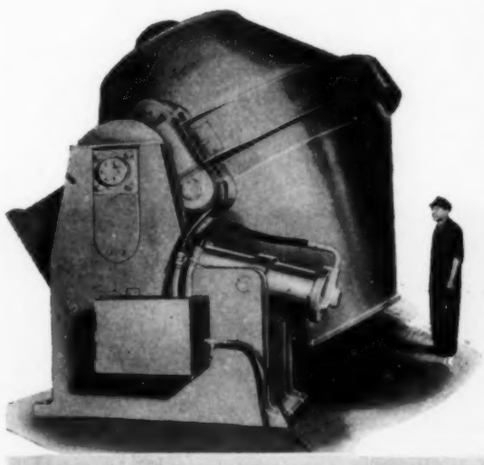
With 135,000 cu. yd. of additional sand and clay fill placed under this contract,

(Continued on page 162)





Out Where Speed and Dependability are "Must" Orders, SMITH TILTERS and SMITH-MOBILES are Pouring Fortifications!



Smith-Mobile charges faster because the wide feed chute has no obstructions—no shafts or rods to clog it up. *Smith-Mobile* mixes faster and better because of its patented "T" shaped spiral blades. It mixes without pressure against the discharge door. *Smith-Mobile* discharges under complete control, either fast discharge or a wheelbarrow full at a time. You can open the end door and inspect the concrete while the drum is mixing. *Smith-Mobile* is simple and rugged with fewer "gadgets" and therefore fewer troubles.

Write today for booklet giving the details.

The T. L. SMITH COMPANY
2851 N. 32nd STREET • MILWAUKEE 10, WISCONSIN

CONCRETE MIXER MANUFACTURERS SINCE 1900

then he thought to himself

"WHY WAIT 'TIL YOU'RE CORNERED?"

AT his recent reception in Washington, General DeGaulle and General Pershing were deploring the havoc of the war and hoping some good might result. DeGaulle remarked that perhaps Mahomet had something when he ventured the statement:

> *"Without war, the world would be in a condition of stagnation."*

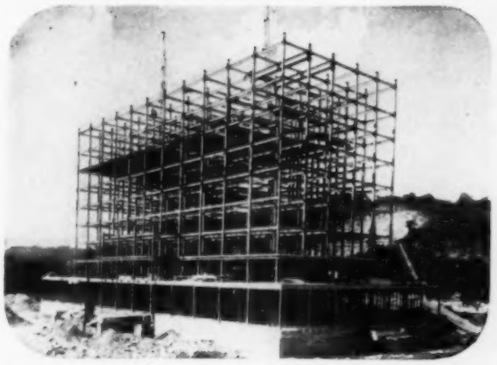
It is a sad commentary on human inertia that men must wait until the gun is jabbed in their ribs before they will stir themselves to great effort.

But it seems a fact that men usually wait for a crisis before they get bold and take hurried recourse to the best means for liberation.

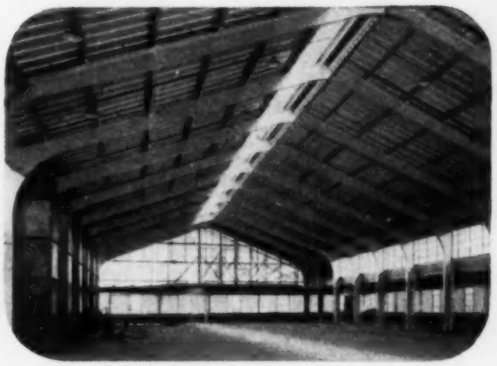
Even today, some business men are waiting for the pointed guns of competition before taking action. And others . . .

WHY WAIT 'TIL YOU'RE CORNERED?" *he says*

LOOK, GENERAL, how some are beating the gun of competition through recourse to Arc Welding:

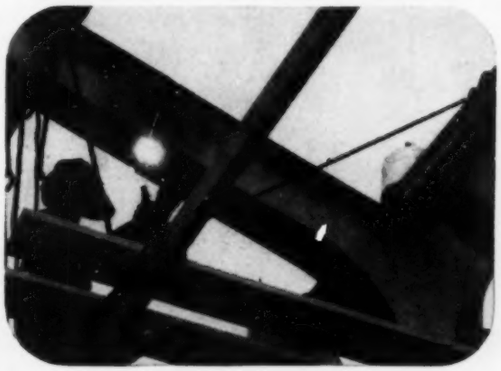


GUN BEATER: LOWER COST. Simplified detailing, fabrication and erection, and reduction in tonnage with welding usually cuts building costs. Total estimated saving on this 14-story building was $20,000.



GUN BEATER: BETTER APPEARANCE. Designs can be streamlined . . . made modern-looking . . . such as in the case of this rigid frame factory building. Elimination of trusses also affords better lighting and reduces maintenance costs.

GUN BEATER: GREATER FREEDOM. Direct connection of steel members enables the designer to create and build more unique structures. Welded combination of I-beams and fabricated haunch sections here made possible a rigid free-standing church structure with 45-degree roof pitch.



GUN BEATER: NOISELESS ERECTION. Elimination of the rat-a-tat-tat of the beaten path method is a valuable contribution to civic progress. Quiet arc welding can be made a potent business-promotion tool for the architect and builder.

Consult the Lincoln-Engineer nearby for advice on how to beat the gun in the building of better structures at lower cost with Arc Welding. Structural Studies free on request.

THE LINCOLN ELECTRIC COMPANY • Cleveland 1, Ohio

America's greatest natural **recourse**

ARC WELDING

(Continued from page 158)

the 80-ft.-high railroad embankment is being widened for a length of 3,000 ft. The new fill has a top width of 30 ft. and a side slope of 1.6 to 1, with the toe at the bulkhead wall. Fill material, hauled by train from a borrow pit 1 mi. away, is dumped from the westbound track, nearest the lake, and is bulldozed over the bank by two Caterpillar tractors. About half way down the slope a 10-ft. shelf is made to give greater stability to the new fill. A P&H dragline operating on top of the bank dresses the slope with a Page 1-yd. bucket. Bucyrus-Erie steam cranes at the toe complete the dressing of the lower part of the slope.

Supervision

For the Pere Marquette Ry. Co., the work was done under general direction of H. A. Cassil, chief engineer, and was designed and is being constructed under the direction of O. E. Hager, engineer of bridges and structures. S. L. Wagner and Ralph A. Smith are successive resident engineers on the job and T. F. Burris, division engineer, is in charge of track work under C. J. Rist, engineer, maintenance of way.

For the Jutton-Kelly Co. the work is in charge of John T. Kelly, vice-president, and R. L. Evans, job superintendent. Merritt Johnson is job office engineer.

Advertisers in this issue

(Continued on page 166)

Why we put tons of chrome where it won't show

Decorative chromium is put where it *will* show. But we put tons of chromium into cylinders of Diesel and gasoline engines where it *won't* show, although you *can* see the results in greatly increased engine reliability.

We use enough chromium in *one* year to chrome-plate the bumpers of every automobile built since 1932. Yet a 16-cylinder, 1800 horsepower Diesel engine needs only 240 ounces of PORUS-KROME to multiply its cylinder life four to twenty times.

PORUS-KROME, applied by the Van der Horst process, is highly resistant to abrasion and corrosion, and "wets" with oil. Experience in thousands of engines in ships, planes, tanks, stationary and mobile power plants, buses, trucks and locomotives shows that PORUS-KROME not only multiplies cylinder and ring life, but reduces scuffing, ring feathering and risk of piston seizure.

Right now, Van der Horst is busy on cylinders in engines for the war. However, it is not too soon for you to plan to have PORUS-KROME in your own engines. When Government restrictions are relaxed, PORUS-KROME will be available to you in new engines and also in replacement liners for existing engines.

Ask for PORUS-KROME . . . and be sure of greater engine reliability.

PORUS - KROME

Good for the Life of your Engines

VAN DER HORST

U. S. PATENTS 2,048,578 AND 2,314,604

VAN DER HORST CORPORATION OF AMERICA • OLEAN, NEW YORK • CLEVELAND 11, OHIO

AN AFFILIATE OF DRESSER INDUSTRIES

WHERE TO BUY

Featuring additional Products and Specialties for the Construction Industry

—SEARCHLIGHT SECTION—

REPRESENTATIVE AVAILABLE

BRITISH FIRM of civil and mechanical engineers established for many years in Egypt with offices in Cairo and Alexandria is interested in representation for proprietary water filtration and sewage plants suitable for small municipalities. Qualified British engineering staff is capable of preparing schemes, estimates and supervising construction. Proposals and information to RA-149 Construction Methods, Aldwych House, Aldwych, London, W.C. 2.

LEGAL NOTICE

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933

Of Construction Methods, published monthly at New York, N. Y., for October 1, 1944.

State of New York
County of New York ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Joseph A. Gerardi, who, having been duly sworn according to law, deposes and says that he is the Secretary of the McGraw-Hill Publishing Co., Inc., publishers of Construction Methods and that the following is to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, to wit:

1. That the name and address of the publisher, editor, managing editor, and business managers is: Publisher, McGraw-Hill Publishing Company, Inc. Editor, Robert K. Tomlin; Managing Editor, none; Business Manager, A. E. Paxton; all of 330 West 42nd Street, New York 18, N. Y.

LEGAL NOTICE

2. That the owner is: McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York City. Stockholders holding 1% or more of stock: James H. McGraw; James H. McGraw, Jr.; James H. McGraw, Jr., Curtis W. McGraw and Edwin S. Wilsey, Trustees for: H. W. McGraw, J. H. McGraw, Jr., D. C. McGraw, C. W. McGraw; all of 330 West 42nd Street, New York City; Edwin S. Wilsey and Curtis W. McGraw, Trustees for J. H. McGraw, 3rd, Madison, New Jersey; Curtis W. McGraw, Donald C. McGraw, 330 West 42nd St., New York City; Mildred W. McGraw, Madison, New Jersey; Wilson C. Laucks, Spruce and Canal Sts., Reading, Pa.; Grace W. Mehren, 73 No. Country Club Dr., Phoenix, Ariz.; Margaret Stump, 1418 Rose Virginia Rd., Wyomissing Park, Reading, Pa.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above giving the names of the owners, stockholders, and security holders, if any, contain not only a list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has an interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

J. A. GERARDI, Secretary.

McGRAW-HILL PUBLISHING COMPANY, INC.
Sworn to and subscribed before me this 29th day of September, 1944.
[Seal] ELVA G. MASLIN.
Notary Public, N. Y. County Clerk ⌘806—
Reg. ⌘480-M-6
(My commission expires March 30, 1946)

Advertisers in this issue

(Continued from page 164)

DIGGING INTO A 3 BILLION DOLLAR MARKET

Cold facts about Blue Brutes will prove to you they're your best bet for post-war building . . . and cold facts on post-war buying intentions prove your market will be there:

A recent survey shows more than $3,000,000,000 has been budgeted for post-war construction plans, underway or completed today.

To back your bid check these features of Blue Brute Compressors against any other brand.

Feather Valves*, simplest and most efficient, soothe maintenance headaches, lessen repairs and delays.

*Reg. U. S. Pat. Off.

Full force feed lubrication throughout engine and compressor.

3-point Suspension "cradles" both engine and compressor in one integral housing, cushioning shocks and vibration.

Check all their strong points. Then take your choice of models . . . truck-mounted, two or four-wheel spring trailer and skid-mounted . . . Diesel, gasoline or electric driven . . . and team them up with Blue Brute air tools for best results.

Ask your nearest Worthington Representative listed on page 162 what models of compressors and air tools best fit your needs.

PC4-22A

Behind the Fighting Fronts with

BLUE BRUTES

On jungle roads and airports 'round the world . . . on Pacific Islands . . . on bomb-blasted roads speeding U. S. Armies toward victory, Blue Brutes are hard at work today . . . and in hundreds of factories, Navy Yards, air bases . . . on vital supply lines behind the fighting fronts.**

**Blue Brute Compressors and Air Tools are painted olive drab for the Army, battleship gray for the Navy.

Get more WORTH from air with WORTHINGTON

BUY BLUE BRUTES

Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have always set the pace for easy operation — available in a wide range of weights and sizes.

WORTH BEHIND THE NAME WORTHINGTON

Worthington Pump and Machinery Corporation Construction Equipment Division, Holyoke, Massachusetts